

Useful
Discoveries.
1746.

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A
TREASURE
OF
Useful Discoveries.

IN TWO PARTS.

- I. REMARKS on divers ALIMENTS or EATABLES, whereby to know which are not digested by our Stomachs; and those unfit for our Bodies are pointed out: Also, an Account of the NUTRIMENT or CHYLE divers Foods give into the Blood; proper to be known by Persons apt to be too Corpulent, or too Thin, in order to prevent Pain and Diseases, in a great measure, and sudden Deaths.
- II. A Number of valuable DISCOVERIES of universal Benefit to the Publick.

DEDICATED TO THE
DUBLIN-SOCIETY.

By B. GODFREY, M. D. Professor of Chymistry, of London, formerly of the University of Leyden.

*Non fingendum, aut excogitandum, sed inveniendum quid
Natura faciat aut ferat.*

BACON.

D U B L I N:

Printed for the AUTHOR, M,D,CC,XLVİ.



T O T H E

Right Honourable and Honourable

T H E

DUBLIN-SOCIETY.

THE Noble and Generous Spirit that is seen at present in the Gentlemen of this Kingdom, and in particular in your SOCIETY, to Encourage and Promote Useful Knowledge and Discoveries, has emboldened me to Dedicate these Attempts of mine
for

DEDICATION.

for the Use of *Mankind* to
your Body, which, if they
meet with your Appro-
bation, I shall look on it
as a sufficient Reward for
my Trouble, who am,
with all due Respect,

My LORDS and GENTLEMEN,

Your most Humble, and

Most Obedient Servant,

B. GODFREY.

T H E

P R E F A C E.

TH E proper ways of feeding our bodies seem as little known to the generality of mankind as the reasons for the effects of the magnet; at least we do not see persons practise them: and indeed there is nothing more difficult than to persuade persons to a regard of any thing said on this subject, so great is the desire of gratifying the itch of the palate.

Many great physicians have laid down admirable rules for regimen, all which seem to lie neglected; and indeed I cannot say I conceive great hopes of rousing up persons to an attention to matters of this kind by the few things I shall deliver: however, I cannot be easy till I have attempted it, and will not yet give up all hopes of success.

As

P R E F A C E.

As to medicine, there are yet abundance of errors in the chymical pharmacy; the galenic is well handled by Quincy; and if that gentleman had as well touched the first as the last, his dispensatory had been invaluable; concerning which I have it in design to write *ex professo*.

As to the processes in part the second, I believe he that puts them to the test will find them facts, or answer, which cannot be said of many things under the titles of secrets, &c. such as are found in Alexis Pedimontanus's art of enameling, colouring, &c. and Lemery's curiosities, many of which contain nothing but falsities and impositions, and the last of these just mentioned scarce more than bare-fac'd lies; for Lemery was not the author of that book, he being
a bet-

P R E F A C E.

a better judge of things, but one Emery, who the better to impose put the L' to his name; from none of which I borrowed any thing. As subjects relating to health are desirable to be known to all, where any words are used that are Latin or Greek derivatives, I have put the English thereto; as I have also those of technical terms.

The proposals for this work make mention of a way of catching fish in tempestuous weather, about which I wrote several letters to a philosophic gentleman without receiving any answer, who as I hear since, has quitted London; but I shall leave no stone unturned to procure an account of it, and communicate it. Touching the fence against a pistol-ball, I have several times ordered three of them to Chester, which I hope to receive before

P R E F A C E.

before long, and will then shew them to all gentlemen desiring it.

But if I had omitted any other particular of less moment, this I hope would plead in excuse for me, viz. the small subscription I have in respect to what I was made to hope for, and that I have added a great variety of observations, &c. more than I promised.

The printed proposals or half sheets which were presented to gentlemen, contain a recommendatory epistle of professor Boerhaave, the date of which should be Jan. 14, 1733-4.

It is well known at London; that I took some pains about seawater, and held correspondence with Dr. Stahl, professor of chymistry to the king of Prussia on that subject; but I confess that what is delivered herein about that, is more owing to that worthy and
inge-

P R E F A C E.

ingenious gentleman the reverend Dr. Hales, than me, as is that about weevels, maggots, salting meat, and emptying mud; but the legislature looks on the introducer of an useful thing into a kingdom as the author of it.

In the chapter on the stones in the bladder, I speak of an observation about the calculous matter in chamber-pots, and of several animals in whom calculi are found, as well as in the human species, which observations I made at Penrith in Cumberland, where I constantly watched Mr. Rudd, a butcher, when he cut open creatures; and at the same person's house I met with the tape-worms in lambs of five weeks old, that were six feet long, and these are the same as the *lati* or *fasciæ* in people; but people have also the *rotundi* and *ascarides*.

The

P R E F A C E.

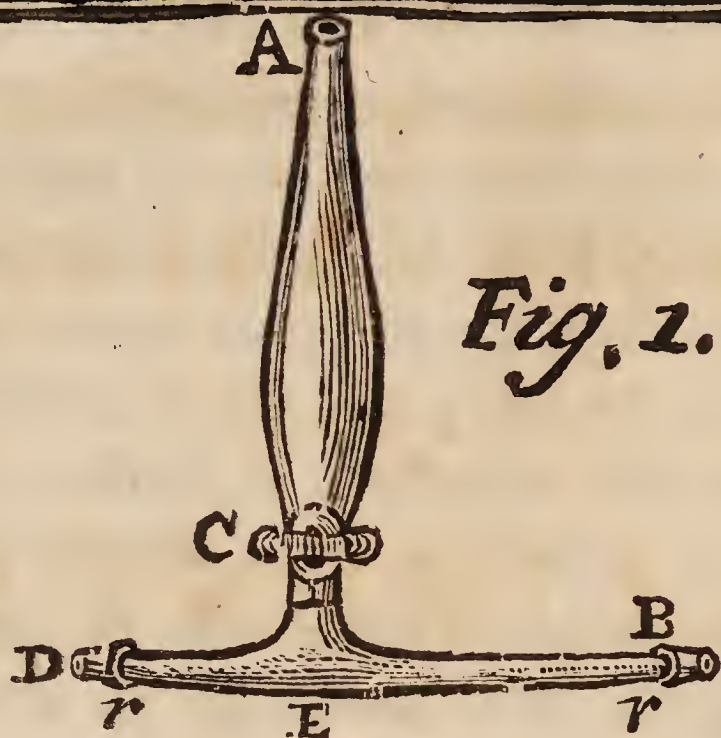
The scrutinies into the male-practices in aliments and medicines were made at London, which I hope may never reach this kingdom.

There is in this piece an useful glue, which is directed to be made with brandy, but as some of the spirits of the brandy is evaporated or lost in dissolving the isinglass, whence the glue may not answer the intent, it is best to boil it first in water, and then add to it as much strong spirit of wine as you think there is water, and so it will be good. Care must be taken that true isinglass be used, for there is a false sort vended that is of common bladders beat or made into that form.

As some few errors in a work are almost unavoidable, the candid reader is desired to correct those with his pen in the paper contained at the end hereof.

T H E





OBSERVATIONS

UPON

ALIMENTS,

In Order to

Health and Long Life, &c.

I Am confirmed in the Opinion, that our Bodies are design'd for about ninety Years, and that if we fall short of that Age, it is in great Part our own Faults, we erring either in the Quantity or Quality of the Aliments we make use of; (not that I would be understood to mean that we are not subject to Diseases, the nice Frame of the Animal Oeconomy certainly renders us obnoxious
A thereto)

thereto) and much further than this Age Life cannot run, because Offifications will not let us; that is, the Grand Channels of our Blood, the Arteries, as well as the other Parts serving to the vital Functions, will turn to Bones, whence the Machine stands still; and this happens the sooner, when the Person has been of a laborious Life.

1. I intend at present to mention those Vegetable Eatables, that I have found by Experiments and Observations not to be wrought on by the Stomach, and which are ejected in a crude undigested State, being useless to our Bodies, and others that are very hard of Digestion.

2. Those of the Animal Kind.

3. Those Eatables that are noxious or improper for our Bodies.

4. I would lay down some general Rules for Diet, for the Preservation of Health.

Vegetables.

Vegetables.

MOST raw Herbs, as Sallets, &c. are of a Texture, or Make, that renders them scarce digestible; for the Stomach works very little upon them, they passing mostly in a crude State: But some Persons being told of this, made Answer, they are of a cooling Nature, they forgetting that many of them are just of a reverse Kind; For Parsly, Sage, Mint, Cresses, Chervil, Raddishes, Horse-raddishes, and Onions, are of a very hot Nature, the three first abounding with an Æthereal Chymical Oyl, the others with a volatile active Salt, which in Plethoric Habits, or a too great Fulness of Blood are very pernicious.

Mushrooms.

TH E S E are wholly indigestible, and a Person may as well eat *Buff*, or *Cork*; besides, some of them are of a

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poisonous

poisonous Nature, as myself have seen in People.

Potatoes.

TH E S E when roasted are very hard of Digestion, and when boil'd are one of the strongest of all Vegetables ; however, if well boil'd, may serve for Food to People who use Exercise.

T R U F F L E S are not digested

Pickled Cucumbers, French Beans and other Pickles,

AR E very little work'd on by the Stomach, besides the Acid or Sourness they carry into the Habit may be hurtful. I have caused a Man to take an Emetic four Hours after eating them, and when they were thrown up, I found them as the Teeth left them.

Raddishes.

Raddishes.

TH E S E are of a very crude Nature, and not digested ; besides their Heat, which makes them noxious; for they greatly heat the Blood.

*Small Nuts, Wallnuts, and (above all)
Chesnuts.*

TH E S E are very improper to be eaten, being very crude, and which occasion a Pain in the Stomach, &c.

Unripe Fruits in general.

TH E S E are likewise extreamly crude and indigestible, and introduce Misc'iefs by their Acrimony, or Sourness ; they bring on the Diarrhæa's (Flux and Bloody Flux) heard of at the Season when Fruits are in this State, which they effect by the essential Salt inherent to the Juice stimulating the Intestines: This Acrimony appears by the blackness

ness on a Knife when unripe Fruits are cut, which shews that Part of the Steel is dissolved. I knew a Youth who died by eating what they call Gooseberry-Fool; and others flung into violent Cholicks. Most Fruits that are ripe may be eaten safely; the most innocent of all are Strawberries; but Currants suit few Persons, because of their Sourness; for Acids agree with few People; the Physician knows best when to order them: This Sourness People think to take off by Sugar, which is a grand Error; for Sugar is an Acid *ex Prædominio* itself, being made up chiefly of such Parts, and committed to Distillation gives a Spirit not unlike Vinegar; it only hides the Sourness from the Taste, and deceives the Palate.

The Fruits that must be eaten with Care above all others, are these, *viz.* Grapes, Mulberries, Figs, and Melons; for these used too freely, bring on frequently a Looseness, like Manna; for the Sweetness in them is a kind of Manna, and

and differing very little from it: *Melons* are of a cold Nature, which often stop natural Perspiration, which is, otherwise speaking, a Surfeit. This also happens from Cucumbers to some Habits, in which they also bring a Looseness.

Cherries,

AR E a good Fruit; and a learned Professor of *Holland* said in one of his Colleges while I was at *Leyden*, that their Juice is very good against a Schirrus of the Liver; but it is a great Error to swallow their Stones, and set so fine a Part as the Stomach to grind on such hard, and often pointed Things. These may be abused; for a Gentleman, at present a Surgeon to one of the Regiments of Guards, told me he knew a Man who did eat five Pounds, by which he was made very ill, whom he relieved by large Doses of Spirit of Harts-horn, which Spirit containing a volatile Alkaline Salt, I suppose, engaged the stimulating acid
Juice

Juice of the Fruit. The late ingenious Surgeon of *Chelsea* Hospital acquainted me with an odd Accident that happened from Cherries, *viz.* that Part of the Skin of one stuck so close on the Coats of the Stomach of a Person who eat them, that the Man almost strained to death in vomiting, before it was cleared from the Part it adhered to.

The next in Order are Eatables of the Animal kind, as Flesh, Fowl, and Fish.

Eggs boil'd hard.

THE Whites of these are wholly indigestible and some of the worst Things we suffer to enter our Stomachs ; they occasion Cholics : Let a Man eat the White of one hard Egg every Day, it's more than probable he shall not live a Year. The Assertion of some, that black Radishes resolve hard Eggs, is a Falsity. Eggs when soft boil'd are one of the strongest Foods

Foods we use: People vastly err, who imagine them a light Meal for a Person not well: which, however, may be eaten at Dinner if soft boil'd: The worst Way we use them, is mixing them with Ale, or other strong Liquors; I have ~~none~~ that *Amor.* done, when the Egg that was put into the Ale ran together again, which making the Stomach uneasy, an Emetic was exhibited, and the Person near Death's Door in getting rid of it.

Cheese toasted,

BEcomes like Leather, and indigestible; it were to be wished, Cheese were used more sparingly, for the Saying, *Casus est bonus quem dat Manus avara*, is true. The Cheshire, is corrosive, for it will excoriate the Mouth, &c. A Gentlewoman at *Waterford* had eaten toasted Cheese, who was uneasy in her Stomach, and who cast it up crude after lying in her two Days and two Nights.

B

Another

Another at *Newry* had done the like, who after ten Days, took an Emelic, when the Cheefe came up crude or undigested.

The TAIL of a LOBSTER is extremely hard of Digestion, and this is well enough known to some People where they abound, who eat all but that Part.

Cockles.

THESE would be best eat raw as Oysters, for boiling makes them hard.

Oysters.

DONE in the Shell on the Fire are rendered indigestible, and a Man may as well eat *Buff* as them; otherwise dress'd, they are very good.

Udder of the Cow,

IS hard of Digestion; which Part is very often unsound, it being subject to Ailments like the Breasts of Women.

Gizzards are untouch'd by the Stomach.

Kidneys,

Kidneys, and the *Heart* (which is a Muscle) are very hard of Digestion. So are the *Lungs*, and the lesser End of a dry'd Tongue hardly work'd on; likewise tough Meats. Meats eat rare done don't afford the same Nourishment as more done, and subject the eater to the Scurvy.

Speaking here of the digestive Faculty, it may not be amiss to take Notice of that of voracious Créatures, as Dogs, Wolves, Tygers, Panthers, Bears, Monkeys, Baboons and Lions, the Stomachs of none of which alter hard Bones, which are found in the same state in the *Stercus* or Dung, as the Teeth left them in. How fabulous then must be the Assertion of the Ostrich's digesting Iron, notwithstanding the Power of his Gizzard to grind. I making the Experiment of the Laurel-Water on the Life of Animals, and killing a Dog thereby in the Presence of some Physicians and Virtuoso's, one of the Physicians bid a Surgeon present cut open the Creature, when we found a Cartilage or Gristle in the Ventricle or Stomach, which the

Owner of the Dog remember'd to have been given him some Hours before, which was unalter'd, or unwork'd one, which is much less hard than a Bone.

Opening a Number of Vipers, I found in the Intestines of two of them a Mouse, which Mice were passing unalter'd, and which could not be digested because of their Skin. It is strange that any Person acquainted with the Animal Oeconomy should expect the harder substances should be digested by the Stomach, (which is not a Millstone) when we know that Digestion is little more than Trituration, Maceration, and Expansion, of the Aliments, by warm, aqueous, or watery Liquors; for to imagine a Fermentation is a Dream; for no Vegetable Fermentation, nor Animal Putrefaction, can be effected in four or five Hours, which is the Time the Aliments are allowed to stay in the Stomach to make a Chyle, before they mount the *Pylorus*, or lower Orifice of the Stomach in order to enter the Intestines, or Guts, to be ejected; of which

Thoughts

Thoughts speaking to a Gentleman, he objected that I did not consider the further Work in the Intestines; and that as the Aliments often remain in them forty Hours, or longer, they might rot or putrefy there: To which I answer, I believe the Intestines, by their Peristaltic Motion, may squeeze and assist in getting the Chyle ready for the Lacteals; but if the Vegetable Aliments rot, or the Animal ones putrefy, I assure myself that what Chyle they should give for the Use of the Blood, would be very improper for it; for it would be an *aliud quid*, a *tertium quid*, (*Corruptio unius est Generatio alterius*) and may be noxious, or poisonous, as we know dead Animals in the state of Putrefaction are. I cannot suppose that a Vegetable ferments in the Body, as it does in the Distiller's Vessel, when he is about the Work of making an ardent Spirit; for I should think that would be hinder'd both by the spirituous Liquors we take in, and the Marine Salt, for I have observ'd, that if a little vinous Spirit be flung into the fermenting

menting Matter, or some Salt, the Operator works in vain. It is a Question likewise, whether the volatile Animal Salt in us would not also obstruct it, which it may easily meet with, our secretions abounding therewith, especially the *Saliva* we incessantly swallow, which Salt I have by a certain Process sublimed from the Shirts of sweating Men by a Water-heat, which cannot be done from the other Parts of our Bodies in a natural State without an arid Heat. It is possible Aliments may stay a longer Time in the Stomach; for an Example has been known, that a Man having eaten Grapes, and having an Ague, an Emetic was exhibited for the beginning the Cure twenty-four Hours afterwards. when the Grapes were cast up no Ways corrupted nor putrefy'd. The same has been observ'd of a Person that had eaten Cherries.

I would now mention a few Things that we ought to be cautious in the Use of, *viz.*

Salt.

IT is pity we are, as it were, necessitated to use Salt; for this Ingredient is but a bad Guest in the Animal Oeconomy; and those at Sea wofully Experience it; for they are full of the Gravel: We never take any into our Bodies without its leaving a Part behind, for it is partly indissoluble to our Fluids, or the humane *Latex*, which contains a good deal of Substance, or Matter itself, and which on an Analysis or Chymical Examination gives the same Principles or Substances as other Animal Bodies do, and thence is less fit to dissolve Salt, which chiefly remains in the Kidneys: This Inaptitude of the Salt to be dissolv'd proceeds from the close Combination of its Acid with its own Earth, which is not so in Sugar, which is very innocent. There are indeed some Gentlemen who think Salt necessary to stimulate the Intestines, for the Protrusion or Expulsion of the Excrements; but I believe Nature
has

has provided for that Work without it ; which is evident from the Observation on the Soldier wounded in the Gall-Bladder.

Philosoph. Transact. N°. 414.

An Observation of less Consequence than this may be made here, viz. That Salt spoils our Teeth by it's acid Part corroding them; wherefore it is proper to wash the Mouth with warm Water after eating. I say warm Water, for too Hot hurts the Juices, and quite Cold does so more. It is also necessary, frequently to wash the Mouth with Tepid or warm Water, whether we have just eat or no, because we naturally abound with a volatile Salt, which joining with a Mucus adheres to the Teeth, and hurts you. The same Precaution is to be used after sweet Things, for Sugar don't spoil the Teeth from any other Cause than gnawing as a Salt. If an Orator of any Class looses Teeth, and for the sake of his Speech is obliged to have false ones put in, it is best to have humane ones, which have a kind of Enamel on them, that makes them hold white ;
whereas,

whereas, both the Elephants Tooth, and Rhinoceros's turn yellow; but the last holds best of the two; however, both pull out the Teeth that the Cat-gut is tyed to, to hold them. It not be amiss too, to add that no one ought to suffer Operators to scale the Teeth, for that takes off the Enamel, when the rest soon crumbles to Pieces; neither, shou'd the Operator file between the Teeth, for a sett of Teeth is like a Brick-arch, the one supports the other, neither shou'd he use Acid Spirits, as some ignorant ones do. Minerall Acids, which will whiten the Teeth, but are sure to ruin them. By Minerall Acids, we mean Spirit of Niter, Spirit of Allum, Spirit of Vitriol, Oyl of Vitriol, Butter of Antimony, the different sorts of Aqua Fortis, and Spirit of Salt, which last is what they fancy to be the best; and indeed vegetable Acids will hurt the Teeth too, and should not be used, which are Lemon-Juice, or Juice of Oranges, &c. If I may be pardon'd the Digression, I wou'd add a Cure against the Tooth-ach, of a
C celebrated

celebrated Operator, that was kept a secret a long while, which was a Dram of crude Salarmoniac dissolved in two Drams of Lemon-juice, with which he wet Cotton, and apply'd. I have found myself that strong Spirits of Wine and Camphire do much good. If I may be Excus'd, further Digression, I wou'd mention a Word touching those troublesome Things Corns and Warts, the last of which proceed from an Acrimony in our Juices, where proper Internals are to be directed by the Physician, and as to external Means, 'tis best to tye an Horse-Hair pretty tight about them, which hindering a Circulation into them, they will Crumble off soon. Volatile Salamoniack bound on them by a piece of Leather, will also destroy them: Corns are indeed a kind of incurable Case, for they go down to the very Periostium or thin Membrane that covers the Bone. They are occasion'd only by Pressure, or the Abuse of Shoes; and indeed we see that the Lips of some Trumpeters have Corns on them, from the pressing of the
Trumpet.

Trumpet. All topical Applications or Plaisters offer'd in News-papers, &c. for this Purpose are Fallacious, and of little Use, as myself too have tried by other external Means. 'Tis better to avoid the Cause than to hope to find a Cure, as it is also in many Diseases; for it wou'd not be difficult to Enumerate thirty Cases, where the Physician and Surgeon, both will be baffled. There was at *London*, Mr. *Hardman*, the best Artist for Corns I ever met with, who Possess'd of a fine Eye and Hand, used to run a curv'd or crook'd Needle into the Corn, when pulling upwards, he cut round it till he got much of the Head away, even so as to leave an Hole as big as half a Pea, which made the Person easy for a good while, and was a good Palliation, which is near all that can be done: If such an Operator is not to be had, a piece of Cloth may be bound round the Toe, leaving an Hole for the Corn to rise through, so that the Prominency of the Cloth will let less immediate Pressure be on it. The above

Hardman getting Drunk one Night near Sir *John Oldcastle's*, fell with his Face into a small Channel from a Cow-house, and was smothered.

Vinegar.

THIS in the Hand of a Physician may be of Service, but is what Persons ought not to make too free with; for Acids or Sours disagree with most People; they introduce a Lentor and Coagulum into the Blood, and spoil its free Circulation; they occasion Cholics, by stimulating the Intestines or Guts, the seat of that Illness.

Oil.

THIS also is of Use in the Physician's Hand, but not to be play'd with; it palls the Stomach, and takes away the natural Appetite.

Mustard.

Mustard.

THIS is of Use in Medicine, but very improper to be made free with in Victuals; for it contains a volatile pungent Salt, which is Fire to our Nature, heats the Blood, and increases its Motion to a great Degree: And of this Kind is Horfe-raddish, very improper for most Habits, but of Use in Medicine.

Spices,

THES E have their Use in Medicine, but are bad Ingredients to make free withal; they contain a fiery active æthereal Oil, which greatly heats the Blood, and which do much Mischief in sanguine or plethoric Constitutions, or where a Person is full of Blood: This Oil is much the same within us as strong intoxicating Liquors.

Onions,

Onions,

AS said before, are very heating, but well boil'd, as is the Custom with Rabbits, their active volatile Salt is driven away, and they become Mild and Innocent.

Cream.

THIS is in such a concentrated or contracted state, as to be very improper to use freely; it is one of the too-good Foods; Nature likes plain and simple Things: It may possibly be of Use to a consumptive Person, who needs the Nutriment that would be too much for another Man. As to Milk, it is an excellent Thing, and wou'd agree with grown Persons as well as Children, saving that they drink strong Liquors, in which it meeting with an Acrimony or Sourness, the Milk is spoiled thereby. I have by several Experiments try'd to take the sourness from
turned

turned Milk, and find it is mended, tho' not quite Cur'd, by spirit of Salarmoniac with Tartar, or Salvolatile Oleosum, which hinder it's curdling in Tea. There was a Man in St. *Martin's* Workhouse, who had eat Milk, and after it drank stale Beer, when he vomited a curdled Matter, four Inches long, and as big as the biggest Finger.

Gravy, as 'tis call'd.

A Little of this just to touch the Meat in, by Way of Sauce, can do no Harm, especially to those who drink at Meals small diluting Liquors; but it is very improper to be supp'd freely, as some do, or to be used in Broth, &c. for it will subject the Users to Fevers, and is bad for those of a Scorbutick Habit; it is concentrated Blood, the more watery or ferrous Part being exhal'd by the Fire, the Remainder is driven into a less Compass, which is too much for Nature.

Sevilla

Seville Oranges.

IF we go by the Guide of Taste only, these seem agreeable; but the Question is not what we like, but what likes us? They are of Use in the Physician's Hand, but noxious to use frequently: The self-same may be said of Lemons, or worse.

Olives Pickled.

TH E S E are extreamly improper for Use, they being full of an Oil that palls the Stomach, and besides contain a pungent Salt, which occasions the Sensation call'd the Heart-burn; that is, a small Inflammation of the Mouth of the Stomach.

Metheglin.

TH I S has a corroding or gnawing Quality, for it destroys Flesh put into it.

Dry'd

Dry'd Currants and Raisans.

TH E S E occasion Cholics, and purge People, especially the first; for the Saccharine or Sugar like Taste proceeds from a Salt that is in them not unlike Manna.

There are some of the Kinds of Fish that disagree with some Persons, which being commonly known, it's needless to name them: If Oysters ever purge (as they will some) it is not from themselves, but the Sea-Salt in the Liquor that is with them; they are admirable Food. As to Muscles, it is pretty well known, they disorder Persons; and I have known of a Man who was full of Blisters by them, others swelled, which proceeds from a poisonous Worm in them. *Sanctorius*, indeed, says, Oysters hinder Perspiration; they are bad in a Plethora, or where the Blood too much abounds; they are apt to run into Corruption, and Fermentation; but though

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I admire many of his statical Experiments, I shall venture on these Fish either raw or gently stew'd. If Herrings or Sprats disorder, it is from their Oil, with which they abound. I speak of purging, because it is a harder Tryal upon the Animal Oeconomy than Persons imagine, and a Work not to be done but by the Physician's Order.

And now of some other Things that Luxury has led Men into, *viz.*

Tobacco.

I Must own I wonder more at the Use of this than all other Things; for Nature startles at first at it; it occasions a violent Sicknefs and Vomiting; it contains a foetid Oil that is next to poisonous: I have known very ill Effects from chewing it; and am sure a Man is better without the Use of it any Way. *Ramazzeni* says it occasions the Piles, renders the Lungs dry, and by robbing us of too much Saliva brings on Consumptions.

And next the favourite Luxury.

Teas.

Teas.

I Am for considering Teas, likewise Coffee and Chocolate, in a natural State, and without analysing or taking them to Pieces; for upon doing that, we find Principles or Substances that do not affect us before they are separated by Art: For Example, upon a chymical Examination of Tea, Coffee, or Chocolate, we obtain a sharp Vinegar-like Spirit, &c. which in a natural State is latent or unperceiv'd, and, as said above, don't affect us as such. Thus Bread, doubtless, is good for all; but if we take it to pieces by a chymical Process, we get an hot Oil, and a sharp acid Spirit, neither of which, perhaps, would agree with us; therefore, I say, I shall not trouble my Reader with the Principles or latent component Parts of them.

The Green and Bohea, I agree with others to be one Species of Herbs, the latter of which is now adulterated, and chiefly by a Solution of Japan-Earth,

which Earth, as it is call'd, I surmise is an inspissated Juice or Decoction of Tea, and sometimes by a worse Way: This Herb has in it a very pungent and even corrosive essential Salt; but as to a fixt lixivial one, as a late Writer asserts, it is a Mistake; for there is no fixt Salt præ-existent to Calcination, such Salts are made during Calcination, by the Acid of the Vegetable preying on its own *Terra*, or Earth, and thereby forming a Salt; and which Salt being kept in the Glass-house Fire, the Acid is driven off, and you have the *Terra*: We may also take away this acid Part by a certain Process with Sulphur. If strong Tea be held in the Mouth, a diligent Observer will perceive an Uneasiness; for it begins to stimulate the Membrane or Skin of the Mouth, &c.

Strong Tea will corrode or gnaw Flesh; it will also corrode Iron: *Kæmpher*, in his Appendix to the History of *Japan*, says that it has a strong Narcotic Quality, (that is, of the Nature of Opium) and that it is unwholesome till kept a Year.

We

We know Examples of People who were great Drinkers of strong Tea, who died thereby, and who being opened, their Stomachs were found ulcerated ; I am confirmed by Observations, and Experiments, that a too free Use of Tea made strong is very pernicious ; its essential Salt spoils the Texture of the nervous Fluid, called the Animal Spirits ; it coagulates the Blood, and impedes its free Circulation : It is an Error to think it raises our Spirits ; it is only the Effects of the hot Water ; hot Water and Straw will do the same, which holds but a little while, and then the Drinker almost trembles. Our own Country produces about eighteen hundred *Simples*, out of which we may pick very pretty Teas, without failing to *Turky*, the *East* and the *West Indies* for a Breakfast, as we do for this Herb, Coffee, and Chocolate, for the first of which we send Coin : Those who are resolved to use it, let them make it small, and add thereto some Milk, which by its butyrous Part
takes

takes off, in some measure, its sting. I am of Opinion that most of the modern nervous Illnesses in *London*, and Lowness of Spirits arise from the Abuse of Tea, and the Use of those deadly Doses, Drams; and in which I have the concurring Sentiments of several of our learned Physicians.

Coffee.

A Few Dishes of this not made too strong can do no Harm especially if some tepid Water (Water that has the Cold taken off) be Drank before or after, as I always do; but I am satisfied, that too strong Coffee may be noxious; for its innate foetid Oil is ratified and pushed towards the surface by the Act of roasting, whereby it becomes like an *Oleum Philosophorum* (as it is called) or Oil of Bricks, very pungent and active, which renders the Decoction of Coffee almost capable of convulsing the Stomach: This hot Oil must surely be had for Persons of a Plethoric

thoric Habit, or that abound with Blood ;
It may be Drank very well as had in the
Coffee-houses.

Chocolate.

THIS is a very strong Ingredient,
and very hard of Digestion ; its Oil
must in Time pall the Appetete : It seems
indeed to give an Appetite, but it is not a
true and natural one, but occasioned by its
stimulating as it goes over the *Pylorus*, or
lower Orifice of the Stomach : It is certainly
too strong for us if made thick.

The Things I have yet to mention that
ought to be cautiously used or avoided, are
spirituous or strong Liquors, touching
which Persons err more than in all Things
else in the World ; I say, I know of no-
thing that the Generality are under so great
a Mistake about as strong Liquors ; and
there is no convincing them of the Rock
that they are about to split upon : They
are accounted our Comforts, our Support
and

and Strength ; whereas they are our Bane and Destruction, and introduce every Thing into the Animal Oeconomy destructive of its Functions. There is a latent Acid in ardent or burning Spirits, besides the fiery Part, which is the merry-making or intoxicating Quality in all strong Liquors, and which is a bitter Enemy to the Spirings of Life : This Acid is evident from the following Experiments, *viz.* Put an Ounce of Spirit of Wine into a Quart of pure Water, shake it, set it by for a few Days, you have a sour Liquor of Vinegar.

2dly, Let a Piece of Lead be laid in Spirit of Wine, which after some Time will have its Surface eaten or corroded, and a Ceruss or white Lead will be formed ; which Power of corroding comes from the acid Salt, one of the component Parts of the said Spirit. Strong Liquors of all Kinds hinder Digestion, they being just of a reverse Nature to what is necessary to it ; they introduce a Lentor and Coagulum into the Blood, and impede or spoil
its

its due Circulation ; They subject the Drinkers to Cholics, and beget Polypusses, They thicken the Juices and Foul the Glands, and occasion Polypusses about the Hearts of Seamen, who Drink them in Quantity : Many are the Mischiefs that might be enumerated, that are brought on by the Use of vinous Liquors ; inso-much that I am sorry Nature has suffered such a Change to be brought about in Vegetables, as their Phlogistic Part to turn to a vinous Spirit by Fermentation.

Touching the different Kinds in Use we would likewise say some-what *viz.* The worst Wines, no doubt, are the thin sharp Burgundy-Wines of *France*, the Champagne and the Rhenish of *Germany* ; they abound with a crude Tartar indissoluble to our Fluids, from their Acid being closely combined with their own *Terra* or Earth, which Tartar subjects the People of the Country to the Gout, Vetigoes, all the Kinds of Hæmorrhages or Effusions of Blood, the Gravel and Stone ; of the nature of those Wines also are

the *Florence* and *Galicia*, and to be avoided alike ; - But if a Man is resolved to drink strong Things, I advise him to drink Water with them, before them, or after them ; for much less Mischief will arise this Way, than by letting them be in the Stomach alone : Oil of Vitriol is a good Medicine diluted by Water, but Death alone : Spirit of Harts-horn is excellent in Water, but likewise Death alone, which I have known to happen ; as I have also from that mild and useful Medicine *Sal Volatile Oleosum*. Sack is one of the strongest of all Wines, thirty-two Ounces of which contain upwards of three Ounces of an ardent or inflammable Spirit : *Rhenish* and some of the *French* are the weakest in Spirit. I wish there were no Adulterations in Wine any where ! Some time since a Man was beheaded in *Switzerland* for using Arsenic and white Lead to clarify Wines.

Malt Liquors.

FRESH small Beer is a good Drink for most People ; but the strong Beers

Beers and Ales of *England* are destructive to Health; nothing occasioning a Dropsy sooner: The most innocent of all strong Liquors are the fresh and smaller Ales.

Punch.

THIS is the worst Composition of Liquor we make; it is prodigiously destructive to Health in many Respects; that with Lemons is worse than that with Oranges; somewhat of the Nature of this is the sharp Cyder.

Drams.

I Cannot mention these Doses without Pain; they are the most deadly of all Liquors, and which continue in Use, notwithstanding the late Prohibition: Drams are near as sure Death as a Sword, tho' a little slower about the Work. The most dangerous is any Kind that is loaded with Saffron, which Saffron in the Hands of a Physician is of great use in Medicine; but

if used too freely, is a Fire; for it will raise Blisters and corrode; and I know a Preparation of it stronger than any of the burning Caustic Surgeons use, and more violent to the Flesh than boiling Oil. Brandy and Rum are the most hurtful in respect of the great Quantity of ardent Spirit they contain, and compound Drams in respect of the hot æthereal Oils they receive from the Ingredients they are composed of. In a Gallon of Brandy there is about two Quarts and a Pint of Spirit; in five Quarts of a made Dram, there is but two Quarts of Spirit. Geneva so much esteemed by the Vulgar, is indeed a vulgar Compound, being the Product of 30 Gallons of Water, and ten Gallons of Spirit, such as we burn in Lamps, with a Quart of Oil of Turpentine distilled together. It is an Error to think the *Hollanders* can make this Liquor better than we; their's generally being done of *French* Brandy which they have cheaper, and we using common Malt Spirits, occasions the Difference; but give the *English* Operator

Brandy,

Brandy, and he will outdo the *Dutchman* ; for Distillation or the Manner of Compounding is much better known here than abroad.

This I have observed touching strong Liquors, *viz.* that if a Man drinks any determinate Quantity of Wine, and at another time Brandy diluted by Water, so as to have an equal Quantity of ardent Spirit and watery Parts in each, he shall find more Inconvenience from the Brandy and Water, than the Wine ; for the Brandy and Water cause the Cholic and a Pain in the Stomach, and affect the Head, which we may suppose to proceed from this Reason, that the Brandy having been rarified and raised in Distillation (which Wine has not) it's Spirit or Parts are in a more active pungent state, and fitter to bring about the uneasiness complained of. Our ordinary Sort of People are more addicted to Drams than any People in the World. Drams in *France* (except Brandy, which they are not fond of) are sold dear, so that they come but little among them ;
and

and in *Holland* and *Flanders* it is not so common to see People drunk. *Touckmanus* the Poet indeed accuses the *Germans* his Countrymen of Drunkenness, by saying.

Germani possunt cunctos tolerare labores,

O utinam possent tam bene ferre sitim !

But I'll answer for our People's outdoing them, than which they can do nothing more conducive to cutting the Strings of Life.

I dare say my Readers will be ready to ask, what things may be used for Food, since so many have been prohibited, and that they will think, *Medicè vivere, est miserè vivere* ; But things being taken right, I believe it will be found, *felicissimè vivere* ; for after the improper Things for Aliments are substracted, there will be found a sufficient Number remaining both to nourish and to please. Touching the Ways of Eating and Drinking, not only *Hippocrates*, &c. and others of the Ancients have left us

very

very good Directions; but the late worthy Dr. *Arbuthnot*, and that very eminent Physician of the *Bath* Dr. *Cheyne* have wrote admirably thereon, whose Works I could wish to be in every ones Hands.

All plain Meats then simply dress'd, no doubt, are generally good Foods, but the boiled is much more easy of Digestion than roasted, whence better for weak Digestion: Of all Meats, Mutton is easiest of Digestion. All Fowls likewise, are good tho' some of them are of a stronger Nature than others, which are generally known.

FISH likewise are proper Nourishment, except the few that are known to disagree with Persons, as Sprats and Herrings: There are some indeed poisonous in the *West-Indies*, Vide Sir *Hans Sloane's* Natural History of *Jamaica*, *Catesby's* History of *Carolina*, &c.

Vegetables, if boil'd, are very good, such as Beans, Pease, Parsnips, and the Herbs usually in Use; the most innocent of all are Turnips; but a Man needs eat

a good deal of them, they being full of a Juice amounting to little more than Water ; for if twelve Pounds of them be laid in the Air, eleven Pounds will be carried off thereby ; and that which is capable of going off so, I believe would afford no Nutriment to us, if taken into the Stomach.

Millet and *Rice* are very good, the last of which should be well boil'd if the Eater of it is subject to be loose.

I am speaking here of what Persons in Health may eat ; when they are ill, Physicians know best how to direct a Regimen. Touching the Quantity to be eaten, I am nor for directing Weight or Measure ; some People must have more than others, especially the working Sort, or who use much Exercise : In the Morning a few thin Slices of Bread and Butter, or a little of the Things made at the Pastry-Cook's, without Almonds or hot Seeds may be eaten, and a little Gruel, Whey, Barly-Water, Sage Tea not made strong, Baum or Ground-Ivy Tea may be drunk ;
but

but if the other Teas must be had, to use them small, adding thereto Milk.

At Dinner let plain Things be eaten, and let them be dressed rather by a Cook of six Pounds a Year than fixty : Also be it a standing Rule to rise with Room for a little more, and not to fill the Stomach too full ; for then it cannot do its Office of Digestion so well, and when pressing on the Diaphragma, it hinders the Play of our Lungs, and we are made uneasy in our Breath.

At Supper very little serves, any little Thing from the Pastry-Cook's, not having in it Meat or any Thing of the Animal Kind, does well ; but the less the better : I am sure we shall live the easier, and the longer by this Rule.

Persons err prodigiously in their Notions about their Foods ; they imagine it's impossible to have too much of so necessary a Thing as Victuals. The Desire of pleasing the Palate in us is very strong : There are many of us who Live to Eat, and Eat to Die, we ride post with Life,

and dig our Graves with our Teeth ; that which should preserve Life to us bereaves us of it ; strange Error !

It is an Error to quit Meat, and to take to Vegetables altogether, except in Case of the Gout, &c. for Meat or Animal Foods are necessary once a Day for most People, atleast in the colder Climates ; for upon an Analysis or Examination of Meat, and the Substance of Human Bodies, they are found to consist of the same Principles or component Parts, and are therefore proper for us.

Lastly, Our DRINKS.

I am steadfast in the Opinion, that Water, and watery Liquors are the Liquors of Life : By watery Liquors I mean (which are all proper Drinks) Barly-Water, Gruel, Whey, Milk and Water, fresh small Beer, Milk-Water, &c. Water is the Liquor of the Universe ; it's the Life of Animals and Plants, and should be of Men, and the only true Digester : All sublunary Things are Water and Earth ;

we

we are for our selves. It is a great Error to imagine strong Liquors support and comfort us ; the Comfort is false, and but for a Time, and leaves a Poison behind : however, I would not rob those of them on a sudden, who have been accustom'd thereto ; yet desire them to believe, that the less they drink, the less Pain they will feel in Life, and the longer Life itself will be. This is my Opinion, and by these Rules I shall steer my Course ; however, I am resolv'd to enter into no Controversy about the same. It has been known that Water has kept a Man alive twenty Days, namely, by diluting, and affording a Serum to the *massæ sanguinis* to Swim in or circulate,

P. S. Speaking here of Health, I would add one more Caution, tho' of a different Kind, *viz.* Not to suffer Children to be swung in a Swing by the Neck to make it longer, as is the present Custom ; for I have known Mischiefs ensue

from it twice, when one Child got a Tumor on the Chest, and another fell into strong Twitchings as if convulsed.



OBSER-

OBSERVATIONS

AND

EXPERIMENTS

On some Parts of the

Materia Medica, &c.

Whence will appear the present Mistakes
about the same.

PART II.

DEsigning to write at large on the
Materia Medica, I thought to de-
fer mentioning the Subjects herein
spoken of till I could produce that Work;
but

but as I know not when I may bring it forth, and as some Things are highly necessary to be known, lest Inconveniences should arise for want of such Knowledge, I resolved to print them first in this Miscellaneous Way.

EXPERIMENT I.

Bole-armeniack is held to be an Alkali or Absorbent, and trusted to as such in Practice; which is a great Error, it being no such Thing, for being try'd with all the Species of Acids, it lies quiet, making no Effervescency therewith. If acid Spirits be poured on *Bole*, they are drawn off again, having the same *Vis* or Strength as when they went on, which cannot be done from true Alkali's. This Substance or Part of the *Materia Medica* is so far from being an Alkali, that if push'd with a strong Heat in Distillation, it gives an acid Spirit; for it contains an *Acidum Vitriolicum*. Most of the *Bole* found in the Shops is only Pipe-Clay and red Oaker ground up together.

EXPER.

EXPERIMENT. II.

Terra Sigillata, and *Lemnia* are also accounted Alkali's, but are not so, which is evident from the same Experiments of trying with Acids, &c. as with the *Bole*: Most of these in the Shops of the *Falsarii* are Pipe-Clay and Oaker likewise.

EXPERIMENT. III.

Saffron, in the Hands of a Physician, is, doubtless, of great Use; but dangerous to be played with: it contains a very active pungent or corrosive essential Salt. I know a Person who made a Mixture of *Saffron* and Spirit of *Rosemary*, which he apply'd to the *Abdomen* of a Child, and the Part was greatly inflam'd and excoriated; and worse would have ensued, had not Means been used. If after the Tincture of *Saffron* be made, the *Magma* or Pressings be apply'd to the Skin of a Person, Blisters will readily be raised; and *Johannes Weidenfeldius's* Spirit of Wine will make an Extract of *Saffron*, one of the most violent

lent Caustics in the World. A learned Physician inform'd me that a Man stole a Pound of Saffron in a Paper, which he hid in his Bosom next his Skin, soon after which he fell into a Vertigo, Apoplexy, and died. Other Authors likewise speak of the violent Effects of this Flower.

EXPERIMENT. V.

Calcined Harts-horn : There is nothing in the *Materia Medica* that Persons err more in than this Ingredient: It is monstrous that any Writer, at all vers'd in Chymical Enquiries, should dream that it is an Alkali or Absorbent; for on Trial it will be found to be no such Thing; and indeed, without Trial a Man should know that, for by Calcination the Volatile Salt, Phlegm, Spirit and foetid Oil are all driven away, when there remains only a dead Earth; for, I hope, no Body will assert the Existence of a fixt Salt in Animal Bodies. Some indeed have said they have found a fixt Salt in Blood after Combustion, which if they did, it must be in human

man

man Blood, and proceed from the Marine Salt taken in with the Aliments; for Sea-Salt is a *Salsum*, partly alcalious, and partly acid, which Acid being driven off by Fire, an alcalious Earth remains. But to return to the Harts-horn, which I say is no Alkali, nor of any Use in Medicine; it is one of the Ingredients of the good Wives favourite Gascoin's Powder, and continues in Families to be the Basis of a white Drink trusted to in a Diarrhæa and Dysentry, in which I'm sure it is of no Use, and I wish I could not say worse Things of it; for suspecting this Substance, Oyster-shells, Egg-shells, Coral and the like calcinated Things to be a Kind of Lime, I consulted Dr. *Gross* a German Physician at *Paris*, and one of the first Chymicus's in *Europe*, who confirmed me in my Opinion, acquainting me that he had known Burnt Hart's-horn given for some time to the Quantity of a Dram for a Dose, and the Taker of it died thereby. It is true we often see the white Drink used without any Harm, because it is order'd

by the Receipt to be strained, or the Hart's-horn is suffer'd to subside, whence little goes down into the Stomach ; for the boiling dissolves none of it. In my Conferences with the first Professor of the University of *Doway* while there, I found this Ingredient not in Esteem in *Flanders*.

EXPERIMENT. V.

Distill'd Milk is thought by many to be no more than common Water, and therefore us'd by few in making the Milk-water ; but that is an Error, for distill'd Milk will make a small Precipitation in a diluted Solution of Mercury, which pure Water will not do, which shews that it contains some volatile animal Salt.

Again let distill'd Milk be kept nine or ten Months, it purifies, and a slimy Matter falls to the Bottom of the containing Vessel, which being catch'd by a Filter, and dry'd, then put upon a red-hot Iron, it burns, glows, and evidently shews a Phlogiston or inflammable Part, exhibiting the Appearances of an *Animale quid* so treated.

EXPE-

EXPERIMENT. VI.

Plantain, Celandine, Eyebright, and the like cold simple distill'd Waters are thought by many to be no better than elementary Water; but if kept an Year, or less, they putrify, letting fall a *Mucus*, which if separated by the Filter, dry'd, and laid on a hot Iron, as in the last Experiment, it exhibited the Appearances of a Vegetable when burning, which shews those Waters are not so simple as conjectur'd to be.

EXPERIMENT. VII.

Cochineal: This is now pretty generally known to be an Animal, or Kind of Lady-bird; but it is Matter of Wonder any heretofore should doubt of it, or contend for its being a Berry, &c. for do but put it into a coated Glass Retort, and surround it by Fire, you will have the same Spirit, as Spirit of *Harts-horn*, a Phlegm, Salt, and foetid Oil, and remaining an Earth without Salt, which ends the Dispute.

EXPERIMENT. VIII.

Juice of Lemons is distill'd with the other Ingredients to prepare the *Treacle-Water*, in order to have an Acid to excite Sweat, which is a great Error; for neither this Juice, nor that of *Verjuice*, nor *Seville-Oranges* come up four in Distillation, neither in the cold Still, nor in *Balneo*, where it comes to a boiling State; and for this reason *viz.* That they have not yet undergone the last Vegetable Putrefaction, which Vinegar has done, and for which reason it rises four in Distillation; tho' a great part of the Acid of Vinegar remains behind when distilled, which is easily perceiv'd by tasting the Remainder, which is very pungent to the Taste; and on trying distilled Vinegar with Vinegar Undistill'd, the last will be found more sour than the first.

EXPERIMENT. IX.

Mercurius Vitæ or the *Emetic Powder of Algarot*, is thought to be *Mercurial*, and used as such; however it is not so, but
Antimonial,

Antimonial, and the *Cinnabar* of *Antimony* made of the same Ingredients is the *Mercurial* Medicine; the Case standing thus, viz. The two Ingredients are *Sublimate* and *Antimony*, the Salts of the *Sublimate* join the reguline Part of the *Antimony*, and form the *Butter*, of which the Powder of *Algarot* is made; and on the other hand, the Sulphur of the *Antimony* joins the *Mercury* of the *Sublimate*, and forms the *Cinnabar*.

EXPERIMENT. X.

Physicians are apprised of what little value *Bezoar Stone* is; but the good Wives and Nurses yet continue its Use, notwithstanding they give an Ounce and half of Gold for an Ounce of it: I am convinced it is a Whim, for which we may use *Crabs-Eyes* mixed with a very little grated *Nutmeg*. The Renowned Professor *Boerhaave* says of it, *Laudatur quia pretiosus*. Upon this Drug I intend further Experiments.

EXPERIMENT. XI.

Laudanum Liquidum affects People's Heads, and begets *Nausea's*, especially if given in a larger Dose, as it is particularly requisite after cutting for the Stone: The following does better; take an Ounce and quarter of Opium, cut it small, put it into half a Pint of common Water distilled, letting it remain therein 24 Hours, often shaking it, then Philtre it, and add thereto three Ounces of Spirit of Wine, it's done; by which Process you avoid the Resin, or sulphurous Part, which is what makes the Medicine offend. Those who prove of adding the other usual Ingredients of the *Laudanum* for Correction, &c. may do it when the Spirit of Wine is added, and then digest.

EXPERIMENT. XII.

Having heard some assert, that the *Aqua Spermatis ranarum* contain'd in it a volatile Animal Salt, I made a Solution of Mercury in Spirit of *Nitre*, diluting the same by
distilled

distilled common Water, into which I poured *Frogs Spawn Water*, which made no Precipitation, and which I tryed both with new *Frogs Spawn Water*, and with old; whence I found it a mistake, it being only a Phlegmatick simple Water, and whence I doubt, that a Distillation in the same Manner from *Snails*, and *Worms*, would be of no great use in Medicine; whereas Decoctions of them prudently managed might.

EXPERIMENT. XIII.

It is asserted by most that *Ants* afford an acid Spirit in Distillation, and that being infused in Water, they communicate a Sourness thereto, so that the Infusion will effervesce with Alcalies; whence they conclude this Animal to differ from all others, the rest of the Creatures all giving an alkalious Spirit: But if this Matter be better examined into, we shall find that this Acidity is not a Part of the Animal, or one of the Principles of which he consists; but

but proceeds from what he carries on his Thighs, and Legs, a Vegetable Production; and that if this Creature be cleared of that adhering Matter, and then Distilled, &c. an Alcalious Spirit will be obtained, as from other Animals.

The *Bee* likewise carries about the same Parts his Products, which are wholly Vegetable, viz. *Wax* and *Honey*.

EXPERIMENT. XIV.

Philtre Whey, gently exhale a Part, set it in a Cellar, it crystallizes, and you have a Salt; exhale again, you have more: This Salt is the nitrous essential Salt of the Grass eaten by the *Cow*, joined to an Animal Mucus, and which being committed to Distillation, gives a Phlegm, a small Volatility, a little foetid Oil, and at last a small Acid: This Salt the *French* grind with crude Mercury, as others do with *Crabs-Eyes*, which they chuse to do, as believing *Crabs-Eyes* may foul the Glands of the Stomach, or clog the Mouths of
the

the Lacteals, which they say, this Salt will not do. The *French* advise it in Consumptions; but I cannot see how any Thing that incides or divides can be good in such a Case; which I refer to the better Judgment of our Physicians; who, I am very sure, excel, and go deeper into Things than any in the World; as do our Surgeons too; notwithstanding the great Opportunities the *French* have; and I believe, I may say the same of my Country-Men the *Apothecaries*.

EXPERIMENT. XV.

The Process of making the Præcipitate *per se* being very tedious, and I hearing a *French* Physician say, that it might be done by frequently distilling the crude Mercury; I put Mercury into a Retort, and distilled it up many Times, when it came up as fluid the last Time, as the first; whence I found the *French* Gentleman had not worked thereon himself; and that there is no other Way but by giving it Time, and dividing by Pebble-Stones.

EXPERIMENT. XVI.

Pulsatilla, being distill'd with Water, it rises white, and catches the Nole when smell'd to, and being kept six Weeks, lets fall a Salt, which is not dissolved by Acids nor Alcalies, and hardly by warm Water.

EXPERIMENT XVII.

Talking with Dr. Cantwell, at Paris, about the Poison of the Laurel-Water, he asserted, that the Water of the *Laurus triumphalis* or Bay, is an Antidote against that Poison, which I shall try at leisure, as others may do, Quere, does it not act by Constipating the Lungs? My ingenious Friend Doctor Ratty has laid down, that Milk is an Antidote against this Poison, and indeed it has so been asserted to the Royal Society at London. The Yew-Tree not being generally known to be poisonous, I acquaint my Readers that it is so: Two Examples have been known of Horses eating thereof, and fell dead. Oleander is poisonous.

EXPERIMENT. XVIII.

On Phosphorus.

Our Phosphorus being given internally, it had no other Effects than occasioning a great *Crepit. Ventris*, or breaking Wind downwards.

EXPERIMENT. XIX.

On the Æthereal Spirit.

The Æther or æthereal Spirit being taken internally by Mistake, it prodigiously disorder'd the Man, flung him into Vertigo's, and made him ill for three Months, he saying (to use his Words) he thought himself bewitched, and did not know how to describe his disorder; But fifteen Drops were taken.

EXPERIMENT. XX.

Upon Myrrhe by a *French* Physician, viz. Take the best Myrrhe, dissolve it in a *Lixivium* of Pot-Ashes, then distill with Water in a small Alembic, or a Retort placed in Water, and you will have a small

Portion of a Chymical Oil, which will have the natural Smell of Myrrhe. The same Gentleman, upon Jalap; Take Jalap, make a Tincture in Spirits of Wine, precipitate that Tincture by Water; when the Resin is sunk, exhale that Liquor to an Extract, which Extract will purge stronger than the Resin of Jalap itself. Again, if you draw a Tincture from the said Extract with Spirit of Wine, that Tincture will not be precipitated by Water. Again, Take Opium, make a Tincture in Spirit of Wine, exhale it gently to an Extract dissolve that Extract in distill'd Water, which perhaps will not take in more than the fifth or sixth Part, which Liquor will be as strong again as the first Tincture and will not be precipitated in an aqueous, nor a vinous Menstruum; these on Myrrhe, Jalap, and Opium, I have not try'd myself.

EXPERIMENT. XXI.

Amber prepared is accounted an Alkali or Absorbent, which is as great an Error
as

as that about Bolearmoniac, &c. for upon all the proper tryals it will be found not to be so. If we take it to pieces by a Chymical Analysis, we meet with an acid Spirit, and an acid Salt: This Ingredient is a Bitumen of a Texture or Make that cannot be altered or worked on by the Stomach; and indeed we find it difficult to dissolve it by any Menstrua, but the Æther; it is of no use in Medicine in a crude or levigated State.

XXII. An Observation; a Man at *Rotterdam* went into a Druggist's Shop, where he called for half a pint of Oil of Turpentine, and desired the Shopkeeper to lend him a Glass, which having received, and put the Oil thereinto, he drank half of it, and went away, desiring him to let it stand a little; and returning in half an hour, drank the rest: after which Doses he was frequently seen in the Streets, which was a surprise to the Physicians, and indeed to my self: It was not known whether he went and drunk Water.

Since

Since I came to *England* I mention'd this to an eminent Physician; who acquainted me that he knew half a Pound drank by a Man, who was only strongly purged thereby.

XXIII. An Observation ; *Elixir Vitrioli* is an admirable Medicine, but as managed in the Dispensatories is spoil'd by the too great Quantity of Oil of Vitriol ; for they order above as much again of the Acid Oil as is necessary, which instead of preserving the *Æthereal* Oils, or fine Parts the Ingredients have to afford, burns or calcines them to a Coal. Quincy, a good Judge of the *Materia Medica*, orders Spirit of Vitriol, and Oil of Vitriol, which must be a Blunder of the Printer, as must the next Process for the *Tinctura Stomachica Amara*, where Spirit of Vitriol is also directed ; he surely intending Spirits of Wine, which if he does in the *Elixir Vitrioli*, he errs in ordering a Pound of Oil to a Pound and a half of Spirit of Wine, which is too much of the Oil ;
for

for half a Pound of Oil is enough for four Pounds of Spirit of Wine: Into this same Error does *Staphorst* run, who certainly was a good *Chymist*.

XXIV. An Observation; *Ens Veneris* is ordered in the Dispensatories to be made of Salt of *Steel*, or *Vitriolum Martis*; but I would willingly know how then have we an *Ens Veneris*? Which Difficulty is endeavour'd to be cleared in *Quincy's* in vain: The Truth is, we ought to use *Caput Mortuum* of *Dantzick* Vitriol, the Basis of which Vitriol is Copper. Others direct blue Vitriol; but this will not make the Medicine red, which is expected to be. *Staphorst* the quondam Operator at *Cambridge*, and at *Apothecaries-Hall* runs also into this Error.

XXV. An Observation; *Millepedes*, or *Hog-Lice*, it is the Custom among many People to roll these Creatures up like a Pill in their Hands, which is easily done, and swallow them alive for Medicinal Use, which

which a Woman having done, the next Day she was very uneasy in her Stomach, of which she complain'd to a Surgeon, who after ten Days swallowing the Creatures, gave her an Emetic, when the *Hog-Lice* came up a live together with the Vomit ; whence we see 'tis improper to swallow such Animals alive.

One of the first Surgeons of *Dublin* had a Woman under Cure for a Case, in which she likewise swallowed live *Hog-lice* unknown to him ; which Woman dying of the Case she was under, and being open'd, the said Creatures were found alive and crawling in her Stomach ; which Account I relating to Dr. *Renaud* Physician to King *Stanislaus*, he told me he saw a Boy take a *Scarabæus Rosaceus* or *Rose Beetle*, which he wrapt up in *Butter*, and gave to a Dog, who some small time afterwards began to stare and look wildly about him, turning his Head about several Times, as if he heard some noise ; when on a sudden he ran furiously away, and was missing the whole Day ;
and

and returning at Night, he was almost fatigued to death with running, which he had done to get rid of the Uneasiness in his Stomach occasioned by the Creature's crawling there with his rough Feet.

Other Miscellaneous Subjects,

*Lapis quadratus Lusitanicæ : or, the four-
square Stone of Portugal.*

EXPERIMENT. XXVI.

THIS being Chimically examin'd, appears to be a Pyrites of Iron, which being powder'd, and the Magnet being held over it, it attracts in : Again, if diluted *Aqua Fortis* be poured upon it and suffer'd to lie upon it a little while, and again diluted when it comes off, and then you introduce into this Lquor powder'd Galls, you have a Purple Tincture or
†
Colour,

Colour, such as Martial Liquors usually afford : This Mineral is likewise found in *Saxony* and *Misnia*.

XXVII..

There are usually found upon Turnips little Hillocks or Excrescencies, in every one of which there is a kind of Insect or Worm, so that it is best to fling those parts away whenever we dress them for eating.

XXVIII *Aurum Fulminans.*

Having about three Drachms of this Medicine lying upon a Balneum-Heat, I went to it next Day to see whether it was dry, when thinking all things were grown cold, I began to unwrap the Paper to view it, when it instantly exploded with a terrible Noise, and exhibited a flash of Light, which is a Phænomenon I have not hear'd taken notice of by others : This Explosion of the thundering Gold hurt both my Eyes, occasioning a great Flux of Blood to them : It also gave a great Contusion to my Hand, by striking its
Force

Force downwards, which is contrary to the Assertion of others who write upon this Subject, and say that it only gives its Force upwards, or sideways.

XXIX.

A Man brought a certain Mixture to a Chymist in *London*, which he desired to have distilled, which the Servant in the Absence of the Master took in to work upon, and which he having set a doing according to the Orders he had received, went down to Dinner ; in the mean time the Mixture blew up with a terrible Noise, breaking the Vessels, and was almost like to blow the Chimney down, which the Master of the Laboratory coming to be acquainted with, enquired of the Person that brought it, what it might be, who answer'd, that it was a Mixture of Honey and Nitre ; So that tho' Nitre alone is not inflammable, yet the Sulphur or phlogistic part of the Honey had afforded Fuel to it, whence a Kind of Gunpowder was

formed. This is inserted, to guard others against working on the like Subjects in the same manner.

XXX.

If a *Frog* be put into a Box, and holes bored therein, and the said Box be laid near a Nest of *Ants*, the *Ants* will entirely dissect the *Frog*, and make the finest Skeleton possible of him, leaving even the Ligaments unhurt. If a *Mouse* be put into the same Box, and his Skin taken off, these little busy Creatures will make as fine a Skeleton of him too; but if the Skeleton be left with them long, they will likewise go to Work upon the Ligaments,

XXXI.

The yellow Matter or Substance cast out of Mount *Vesuvius* in *Italy*, and sold in the Colour-shops by the Name of *Naples-Yellow*, is a Kind of Ocre, and upon an Analysis affords a small Quantity of Iron.

XXXII.

XXXII.

Crude Sulphur and Quick Lime being mixed together in about equal Parts, and put into a Vessel, and cover'd with Earth, will in no long Time afterwards burst out into a Flame, and fling up the Earth : This I had of a *German* Physician; I have not try'd it; May we not hence Account for Vulcano's and Earthquakes ?

XXXIII. *On the Viper.*

It was proved at *Paris*, that the Head of a *Viper* 24 Hours after being sever'd from the Body, did bite a Man, so as to occasion the usual Symptoms, and which happen'd to an *Apothecary's* Journeyman there. This is a Creature of prodigious Life and Vigour; for after the Head is taken off, and the Skin, and all the Viscera taken out, the Body will strongly vibrate or move in a String fourteen Hours after that.

XXXIV.

XXXIV. *Mustard-Seed.*

This Ingredient gives a Phosphorus, which is a Phænomenon few would expect.

XXXV.

Black Glistering Writing-Sand.

This being Chymically examin'd, appears to be a Minera of Iron.

XXXVI.

Hair-Powder is often adulterated or mixt with Lime, which if so, it will be discovered by this Experiment, viz. put a little powder'd crude *Sal Armoniac* to the suspected *Hair-Powder*, adding a little warm Water to the Mixture, and stir it about, when if it was adulterated with Lime, there will be perceived a strong smell of *Sal Armoniac*, because the Lime will volatilize the *Sal Armoniac*, from the known Reason of it's receiving into itself the Acid that held the volatile Salt, which is then set at Liberty.

XXXVII.

XXXVII. *Acid Spirits.*

It has been asserted by some, that all acid Spirits may be reduced to Elementary Water by repeated Distillations, but I believe this to be an Error; for being distilled an hundred Times, they came up Acid to the last.

XXXVIII.

Rain Water, being catch'd in Glass, and not suffered to come near any any Vegetable Substance, or Vessel of Wood, will keep good 40 Years, which has been experienced; and it is to be believed would do so longer.

XXXIX. *Distill'd Water.*

This being likewise kept in Glass, as abovesaid, has been found to keep good ten Years; and, I doubt not, would keep a great while longer. *Bristol* hot Well Water, was kept five Years and a half, and good.

XL. Eggs.

Eggs being placed under a running Water in a Rivulet, have been found to be good and eatable two Years afterwards; and which being put under a Hen produced Chicks. Eggs being also cover'd with a proper Varnish will be good a Year afterwards, and being laid under the Hen, produce Chicks likewise. The Varnish above is of *Bees-Wax*, Turpentine, and Colophoney melted together. Melt *Bees-Wax*, dip the Eggs therein, which adhering to them, they will be preserv'd a long while so. They are kept at Sea by a lay of Salt three Months; but lessen somewhat in their bulk, which may proceed from the Salts partly dissolving or cutting the Shell, whence the Moisture gets an Exit. Put an Egg for one minute into water just about to boyle, it will not then be hard, and will Keep well a Month. Lay one a very little while in Sweet Oyle, it keeps half an Year. If a Hen feeds on Hemp or Flax-Seeds the Eggs will
smell

smell and taste of them. The white of an Egg will be harden'd by the pocket

XLI. *Bitters.*

Bitters are seldom found to rise in Distillation; but some Kinds of the *Colocynths* have been proved to give a bitter Taste in Distillation:

XLII. *Gall Stone.*

This Concretion is prodigiously sulphureous; for it swims on Water and burns like Camphire, whence it differs from the Stone in the Bladder.

XLIII. *On Toads*, by the late Baron Schack, Envoy of *Moscovy*: Take three or four live Toads, put them into a Bag, add thereto three or four Pounds of Kitchen-Salt, shake them about till the Toads are dead; a little of this Salt he asserted is a violent Poison. This Gentleman also asserted, that a Countryman lying asleep upon the Ground, with his Bosom open, a Toad crept upon him, and laid upon

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his

his Breast ; where the Part afterwards was very much inflam'd : which Things, if Fact, prove some Toads, at least, poisonous, which is denied by many Naturalists.

XLIV. *Acid Spirits.*

To concenter them, and render them of a double Strength, take *Lapis Calaminaris*, powder it, power any acid Spirit upon it you have a Mind to make your Experiment on ; distill gently ; there comes over a Phlegm, which take away, and add thereto another Receiver, push the fire, and there will arise the heavy Acid Spirit much stronger than before.

XLV. *On Glass.*

To reduce Glass again, take Salt of Tartar or Pot-Ashes three parts, add to it one part of melted Glass, expose it to the Air, and it is no more Glass ; it's Earth may be precipitated with Vinegar. This was asserted by a *French* Physician, I have not tryed it.

XLVI. *A Spirit prodigiously volatile.*

Take double *Aqua fortis* one Ounce and a half, Quicksilver an Ounce, let it dissolve, and stand till it is near cold, not quite, for fear it should crySTALLIZE, then put it to two Drachms of the best *French Spirit of Wine*, shake it about, till it looks Milky, and there will be perceiv'd upon the uppermost Part a Kind of Oil, which you must nimbly separate by a Glass-Funnel, by stopping the Stem with the Thumb, by withdrawing which a little, you let out the lowermost Liquor till you come to the uppermost, which is what you want, and which must be conveyed into a Bottle with a Glass-Stop, or else it will be gone ; if you don't succeed the first Time, you must try again till you do : This Spirit or Oil is so volatile, that a Drop being let fall from a Height of five or six Feet it does not go to the Ground ; or if you drop a Drop on your Nail, you'll see it rise into the Air : This

Preparation is much more volatile than the Æthereal Liquor.

XLVII. *A Spirit that is always in a Fermenting State or in Motion.*

Take Block-Tinn two Ounces, dissolve it in *Aqua Regia*; take also thin hammer'd Lead an Ounce and half, dissolve that in *Aqua Fortis*, mix the two Solutions, add to them an Ounce and half of Antimony, and two Ounces of Mercury, put them into a Glass Retort, join a Receiver, lute it, leaving a Pin-hole in the Lute, distil, there comes over a white Spirit, which must be kept in a Glass with a Glass-stopper, so as to be but half full, to give it room to move. To hammer Lead thin you must do thus, viz. put many pieces of Lead one upon another, so beat it out, then you can dissolve it, otherwise not. Written to me by a German Chymist. *I've not try'd it.*

XLVIII.

XLVIII. *To receive Mercury without Distillation.*

Take *Sublimate*, add to that an equal weight of Filings of Steel, pour thereon a Quart or more of Water, boil it; and before the Water is boil'd away, you'll see the Mercury running.

Of the Danger the Publick are under from the present Male-Practices in Medicines, and Drugs, &c. with the Ways to discover and avoid the same,

I N the preface of this Work, I have mention'd a Design to write *ex professo* on the *Materia Medica*; in order to shew the Mistakes about the same. There is another thing full as necessary as that, on which we wou'd likewise say somewhat in these Papers, *viz.* the shocking ill Practices, Adulterations or Sophistications in Medicines both Chymical and Galenical, as well as Drugs; which are grown to
such

such an Height now, and thereby the Health and Life of Mankind so played with, that there are no Crimes Men commit that more loudly call out for a Law for Punishment than they. This is obvious and plain at first View; for if a Medicine that costs the faithful Preparer four Shillings *per* Pound to make it, be sold by some of the Moderns for twenty Pence (as is done) we need no mathematical or logical Reasonings to prove that the said Medicine must be a Fraud.

It is these wretched Practices that have brought the most noble Science, *Chymistry*, into contempt, and made it now as much a Trade as Shoemaking, &c, &c. But I hope yet to see it revive, and bear the esteem which that great Revealer of Nature's Works deserves.

Far, I say, far be it from me to Design in the least to give Offence to honest Persons and Men of Integrity, concerned in Medicines and Drugs, such being yet, I hope to be found among us; who, I doubt not, will readily join with me in this Search;

Search; and as to the Guilty, I am not anxious about what they think.

*A Discovery of some of the most flagrant
ill Practices in Medicines and Drugs,
&c. viz.*

I. Flowers of Sulphur.

THIS is often vulgar Roll-Brimstone powder'd, which itself is an adulterated Thing, and such as Matches are made of, and having Spirit of Vitriol added thereto, which a Patient of an Apothecary a Friend of mine having taken, he had like to have lost his Life from the Sharpness thereof.

This will be discover'd thus, *viz.* Pour warm Water on the false sort, and the Sourness will be taken out by it, and the Water when separated from it will be acid; which will not be the same with the true.

Again, let a Gallipot be fill'd with the true, and when emptied out, let the same
be

be filled with the false; when let both be weighed, and the first will be found much lighter than the last. We know that Flowers of Sulphur should be a little more acrid than beaten Brimstone, because its innate acid Spirit is rarified in some Measure by the heat the Sulphur receives to raise it into Flowers; but that Acidity is ill imitated by our *Falsarii*.

II. *Album Græcum*.

This we know should be Dog's Dung, a thing easy to be had, which on Examination, I have found to be Lime and Hair made up in that Form; which Fraud will be discovered by these Experiments, *viz.* Let true *Album Græcum* be distilled in a Retort by a good Heat, it affords a volatile Salt, a Spirit and Phlegm.

The false Sort will afford nothing but a little that the Hair gives: The true being put on an hot Iron, it gives a copious white Fume for a long time, which is the Exhalation of the aforesaid Principles. The Lime and Hair will give but little Fume
in

in respect to the other, for nothing comes from the Lime.

Let an Ounce of the false Sort be rubbed in a Mortar with half an Ounce of crude Sal-armoniac, adding thereto a little warm Water, the Sal-armoniac will be rendered volatile, and a strong Smell will be perceived ; which will not happen on mixing the true with the Sal-armoniac.

III. *Black-Cherry Water.*

This is imitated by a shocking Practice indeed, viz. by distilling Laurel with Water, the direful Effects of which we have had Instances not long since, both here and in *England*: Myself gave only three Drachms of the said Water of Laurel to a Dog a Foot high, who instantly was struck dead. This dangerous Water will easily be distinguished from the right by its Taste, and Heat, and from its having an Oil floating about it, which true Black-Cherry Water has not. It has likewise a prodigious strong Scent, as it were

L

of

of Kernels, whereas that of Black-Cherries is very weak in respect of it.

The next Imitation of this Water is by distilling bitter Almonds in Water, which tho' it is not giving an hurtful Thing in the delivering a *quid pro quo*, yet it is letting the Patient go without what the Physician designs. By this last Way is almost all the present *Ratifie* made.

IV. *Syrup of Violets.*

This is done by our Artists of Logwood that the Hatters dye Hats withal, coarse Sugar, and Water; which will be discovered thus, viz. The true Syrup will have the smell and taste of Violets; which that of the Logwood will not: The true will answer the usual Trials of turning green when joined to an Alkali, and red with an Acid; which the false will not. The true will not grow black with the other Ingredients of the Hatter's dye, as that of Logwood will. Those with Consciences as bad, do it by distilling a Water from Orris Roots, and then hang in it
a bag

a bag of Indigo, then sweeten : Indigo has a noxious Quality.

V. *Oil of Anniseeds.*

This is usually brought from *Tyrol*, and when here, is mixed with half its weight of Rapeseed-Oil or other mean Oil; and to make it candy in the Winter, some base Parmacitty is added thereto, which Frauds are thus discovered : If true Oil of Aniseeds be dropped on white Paper, and held near the Fire, the Oil will rise off, so as to leave the Paper near clean : But if the same Tryal be made with the false Sort, the Paper will remain very greasy ; because the base Oil in it, and the Parmacitty, cannot rise off by the heat that is given.

Again, true Oil of Anniseeds being dropped into Spirit of Wine, it is dissolved thereby ; But the false makes the Spirit grow whitish, and look thick, because the Rapeseed Oil, or others mixed with it, refuse to be dissolved by the Spirit.

Again, let a Pound of good Oil be put into the Alembic with Water, and distil-

led, it all comes up ; let the same Weight of the other be put there, perhaps not above half a pound is had ; because the Sperma and Rape-Oil cannot rise by that manner of Distillation.

VI. *Crabs Eyes.*

These are a useful Part of the *Materia Medica*, and often used, so that it is pity we should not be supplied with the genuine Thing : They are imitated by making up Pipe-clay in the form of *Crabs Eyes*, which Clay is no Absorbent, nor of any Use in Medicine ; of which if we speak to our Sophisticating Artists, they will tell you they give nothing hurtful in the Substitution. But if a Patient dies for want of the Medicine intended by his Physician, I would know how far short of poisoning him this falls ? The Fraud is discovered thus ; strike on the true thing with an Hammer till it breaks, and observe the Surface within, which looks like polished white Marble ; the adulterated looks rough,

as

as it were a Powder stuck or caked together.

Again, pour any acid or sharp Liquor on the true, a great Effervescency or Stir is seen; pour the same on the false, all lies quiet.

Again, distill the true in a naked Fire, they give Principles inherent to Animal Bodies; distill the false, they give nothing if dry. Pour diluted *Aq. fort. simpl.* on the powdered *Crabs Eyes*, they are dissolved thereby, and converted into a Kind of Salt, which does not happen with the false. It is scarce needful to acquaint those not conversant in Physic that they are not the Eyes of the Crabs.

VII. *Salt of Amber.*

This Medicine is of great Consequence in the Practice of Physic, and none more adulterated than it: It is imitated by the modern Sophisticating Artists by mixing or gently grinding common or crude *Sal-Armoniac* with the browner Oil of *Amber*, which Fraud is thus detected: True *Salt*
of

of *Amber* will be dissolved in Spirit of Wine; the false Sort just mentioned will not, nor will any other Salts in Use but *Terra foliata tartari*, and Corrosive Sublimate.

If the false be mixed with quick Lime, and a little warm Water be added thereto, stirring all about, a strong Smell of volatile *Sal Armoniac* will be perceived, which will not happen with the true.

VIII. *Spirit of Harts-Horn.*

This is much adulterated, as thus, viz. some of these Artists are base enough to make a Spirit out of Horse's Bones, or any other Bones that they can cause to be picked up.

Others mix Lime and crude *Sal Armoniac* together, grinding therewith a few Drops of foetid Oil of any Bones, and pouring warm Water thereon, by which Process the *Sal Armoniac* will be rendered volatile by the Lime, and so it will catch the Nose; but the Acid Part of the *Sal Armoniac* will be dissolved as well as the Alcaline,

Alcaline, so that it is not the Medicine we expect. This Fraud will be discovered thus, viz. Put true Spirit of *Harts-Horn* into a Cucurbit or Retort, place the same in a Water-heat, the Spirit will all rise.

Put the just mentioned false Spirit into the same Vessels, distill, some volatile Salt and the Water will arise, and the Acid Part of the *Sal Armoniac* will remain behind.

IX. *Salt of Tartar.*

For this we usually have given us only powdered Pearl-Ashes, or Pot-Ashes. The Fraud is known thus, viz. True *Salt of Tartar* is totally dissolved in Water: Pearl-Ashes, &c. will leave about a fourth Part undissolved: If they dissolve the Pearl-Ashes, philtre, and exhale, and give us that, the Salt remaining will be whiter than true *Salt of Tartar*, and be more pungent to the Taste than it.

X. *Sal Mirabile.*

The true sort is now seldom made; what is vended is only the common *Epsom Salt*
in

in larger Crystals ; done where Kitchen-Salt is made near the Sea : This is easily distinguished by the taste ; the true having a vitriolic Taste on the Tongue, and the false a bitter one like the *Epsom* Salt. Or,

Diffolve the true in warm Water, set it in a Cellar it shoots into Crystals ; proceed in the same manner with the false, it does not give those Crystals ; because it wants the Acid of the Oil of *Vitriol*, one of the Ingredients of the *Sal. Mirabile*, and which is necessary to form Crystals ; and because it has in it too much of the Alcaline Part of the common Salt ; for Alcalies run not into Crystals.

XI. *Salt of Wormwood, Salt of Broom, of Chamomile, of Juniper, of Ash, and the like vegetable Sales.*

For these we usually have given us only powdered Pearl-Ashes or Pot-Ashes, or these dissolved, philtred, and exhaled to dryness ; the Frauds are thus detected, viz.

The true Salts are totally dissolved by warm Water ; the false above named will

will leave a fourth part undissolved ; the false are very white, the true are brown, unless they are put into a Crucible, melted, and then dissolved, and philtred, and the Water drove away till they are dry : Which if they are so treated, they will become more sharp or pungent to the Nerves of the Tongue than they ought to be.

XII. *Sperma Ceti.*

This is very much adulterated, and chiefly by mixing with Tallow, which is easily perceived by giving it a friction between the Fingers and the Thumb, and holding it to the Nostrills; which will have the same Smell as if we rubbed our Fingers on a Candle; whereas the true *Sperma* so tryed has a clean and grateful Scent.

Again, the false *Sperma Ceti* will soon turn yellowish; whereas the true will keep white much longer.

XIII. *Præcipitatum Rubrum, or red Precipitate.*

This is usually adulterated by mixing red Lead with it; whence this cannot have the same Power for a Surgeon's Use as the true. The Fraud will be discovered thus, *viz.* by converting the *red Precipitate* into running Mercury or Quick-Silver by the proper Operations (as all Mercurial Preparations may be done) when more Mercury will be obtained than from the false.

Again, by adding a proper Alcalious Matter to the false Sort, and distilling off the Mercury; and then by treating the Remainder with a proper Flux, when the Lead will be had from it.

XIV, *Native Cinnabar.*

This is usually adulterated by mixing with it red Lead, such as the Pencils are made of, and not the same as just now mentioned with the *red Precipitate*, which is made by Fire;-----This Fraud is discovered

vered by much the same Experiments as in the last Article.

XV.

All the purging Medicines in general are likewise basely prepared by some; for Example, *Electuarium Cariocostinum* should have in it for its purgative, *Scammony*; instead of which we have given us *Gum-boge*, which is an Ingredient rarely or never now prescribed by Physicians,

Electuarium Lenitivum should have in it Leaves of *Senna*; instead of which *Gum-boge*.

Purging Spirit of *Scurvey-Grass*, likewise *Gum-boge*, instead of using *Jalap* and *Scammony*, directed by the Dispensatory. It is indeed difficult to distinguish the Fraud in the Electuaries, where there are so many Ingredients blended together; but who ever takes such adulterated ones, will soon find the Effects in his Health. But as to the Spirit of *Scurvey-Grass*, the Fraud may be known by dropping it into Water, when that with *Gum-boge* will

give a very yellow Precipitation, whereas the right will give a white. Instead of the various Spices that Medicines should have, *Jamaica* Pepper, forsooth, must serve for all by our Artists.

If it be not amiss in this Place, we would insert that the dried Leaves of *Scrophularia Aquatica*, two Drachms of it infused with as much *Senna*, takes off its ill Taste and Smell.

XVI. *Peruvian Bark.*

This is a part of the *Materia Medica* that is extremely necessary, but much adulterated, especially for the use of the Country, (for there goes a Cant-Word, *Country-Goods*) whither there goes many Hundred Weight of Oak-Bark dyed in the Dyer's Dye-Pot.

The Fraud is easily known by breaking a Piece of true Bark, and a Piece of the false, and smelling thereto; likewise by tasting them both; also by breaking the false and observing the inside, which will not look the same as the outside; and lastly,

ly, by filling a Gallipot with the Powder of the true, and then filling the same with the Powder of the false, and weighing them both afterwards, when the true will be found much lighter than the false; neither will the false give a Resin like the true.

XVII. *Tartarus Vitriolatus.*

For this Medicine I have seen common *Saltpetre* served; this Fraud is easily discovered thus, viz. by the Taste, and likewise by putting a little of each into the Fire, where the *Saltpetre* will burn or de-flagrate, and the true *Vitriolated Tartar* will not.

XVIII. *Diaphoretic Antimony, and Ceruss of Antimony.*

For these Medicines the Buyer often receives Chalk: It's known thus, viz. Pour an Acid on either of the genuine Medicines, all lies quiet: Pour the same on Chalk, a great Stir or Effervescency ensues; the true Medicines will not be dissolved by Spirit of
Vitriol

Vitriol or the like Acid; Chalk can be dissolved. *Diaphoretic Antimony*, or *Cerufs*, may be turned back again to *Regulus* of *Antimony*, or to *Antimony* itself, by chymical Processes: Nothing is had from Chalk.

XIX. *Spirit of Turpentine, called the Æthereal Oil.*

For this we seldom receive any thing but the common Oil of *Turpentine*. It's known thus; Mix Spirit of *Turpentine* with Spirit of Wine, tho' it is not dissolved or does not unite therewith like æthereal or chymical Oils, yet it does so better than Oil of *Turpentine*, for that occasions a great Whiteness, or makes a troubled Mixture. Drop two or three drops of Spirit of *Turpentine* on white Paper, and the same number of drops of the Oil, holding both to the Fire; when dry, that with the Spirit will look clearer than that having the Oil.

Again, put a Pound of Spirit into the Alembic with Water, distil, all comes up clean;

clean; distil as much of the Oil, a resinous or pitchy Matter is found floating in the Still.

XX. *Chymical* Oils are sadly adulterated, some are mixed with Sallet-Oil, some with Linseed-Oil, others with Spirit of Wine. If with the said Oils, you discover the Cheat thus; mix genuine Oil of Cloves or the like with Spirit of Wine, it is clear. Mix Oil of Cloves adulterated, as said, with Spirit of Wine, it becomes thick, or looks troubled, because the expressed Oil in it refuses to be dissolved by the Spirit of Wine.

Drop true Oil of Lavender, &c. on white Paper, hold it to the Fire, it is exhaled, and the Paper remains clean. Make the same Experiment with the false Oil, the Paper is left greasy. Distil true Oils with Water in the Alembic, all comes up; distil false, the Sallet-Oil or Linseed, that had been mixed therewith, will be found in the Still, and only what was true will arise.

If chymical Oils be mixed with Spirits of Wine, and you pour them into a Glafs of Water, a white Precipitation enfues; which dont follow if true.

XXI. *Turpeth Mineral.*

This is too often adulterated by mixing with it what is called *Masticot*, or yellow Lead, which is one of the most dangerous Tricks that is played; it is discovered thus: If Lime or Filings of Steel be put to the *Turpeth*, and the Mixture distilled in an Earthen coated Retort *igne aperto*, having a wet Rag tyed to its Pipe hanging in a Bason of Water; all the Mercury will be had in a running crude State in the Water; and the Salts that held it in disguise will only remain behind with the Absorbent added. If false *Turpeth* be so treated, less Mercury will be had from a Weight equal to the true just named; and besides, by the Use of proper Fluxes the Lead may be had out of the Fæces or Remainder in a crude State; but as some of these Examinations or Tryals are not easy to be made
by

by Persons not conversant in Chymistry, the chief Remedy they have left, is to apply for Medicines and Drugs to Men of Integrity and Veracity; for such, we hope, are yet to be found. Of these Subjects more in due time.

XXII. Nitre or Saltpetre is adulterated by Rock-Salt, which I have found so here, and this will be discovered by putting it on a red hot Spatula, where it will crack if adulterated, otherwise not. If you pour hot Water on it, it will not all be dissolved where Salt is, otherwise will.

XXIII. Rosin is put into *Hungary* Water to make a whiteness when it is poured into Water. This will be discovered by putting this Cheat *Hungary* Water into a Tin Pot, and holding it over a Candle till the Spirit is driven all away, and the Rosin will be then seen.

XXIV. Sulphur is adulterated by mixing with the roll white Sand, which being melted, will let fall that Sand, and you'll see it.

Calculus Humanus, or Stone in the Bladder.

THIS Subject has employed both the Thoughts and Hands of many great Men, and most of them have taken their Hints from *Helmont*, who doubtless has delivered many Things worthy Notice; however, I must confess I always doubted his Veracity in several Respects, and account both him and *Paracellus* to have wrote more on Enthusiastic Principles, than Mechanical ones; the latter of which Authors Book in Folio might be reduced to a Treatise of a Groat. One of the chief Things or Experiments that has led ingenious Men into a Hope that the Stone will some time or other be dissolved by Remedies, is that of Sulphur's being dissolved by Oil, a mild Menstruum, which is so difficult to be touched by other Menstruums; likewise that of divers Stones being dissolved by a Spirit of Rye-bread. After *Helmont*, the first Chymicus's in the World thought
of

of this Thing, *viz.* The truly admirable *Boyle, Becher, Kunckelius, Dippel*, who wrote under the borrowed Name of *Christianus Democritus*, Professor *Stahl*, Baron *Schack*, a Gentleman well versed in the most difficult Part of Chymistry, the Mineral; the Professor *Magnificus Bullfinger*, *Roffer* the Famous Chymicus now at *Hamburg*, the late great Professor *Hoffman*, and the Renowned Professor *Boerhaave* : These great Masters in Chymistry have wished for the effecting the great Work of dissolving the Stone, and the last of which has laboured therein many Years; but these truly able Chymicus's not having brought about the Work, I confess that I, such a *Tyro* in respect to them, could have very small Hopes. However, for Amusement sake, I made some Tryals, tho' without the success wished for, which I will set down to save other abler Inquires the Trouble of going through the same again.

*Menstruums or Liquors tried on the Human
Calculus's, out of the Bladder.*

Spirit of Manna.
 Spirit of Honey.
 Spirit of Bread, of Wheat.
 Spirit of Sugar.
 Spirit of Barley.
 Diluted Spirit of Salt.
 All the Kinds of Aquæ-
 Fortes diluted.
 Lotio Mercurialis diluted.
 Spirit. Vitriol. Philo-
 sophic : diluted.
English Vinegar diluted.
 Sour Milk.
 Juice of Lemons.
 ----- of Seville Oranges.
 Cyder the sharper sort.
 Diluted Verjuice.
 Sour Small Beer.
 Spirit of Guaiacum.
 Of Verdigrease rectified.
 Spirit of Tartar.
 Spirit of Rice.

Diluted acid Spirit of Sal
 Armoniac.
 Diluted Effentia Diapho-
 retica.
 Diluted Spirit of Alum.
 A Solution of Nitrum
 Antimoniatum.
 Wine Vinegar; for all
 the Vinegar generally
 in use, is only Small-
 beer, which when in
 the Hands of the Chand-
 lers or Retailers, has
 two Parts of Water
 added to it.
 Diluted Spirit, distilled
 from Sal Mirabile.
 A diluted Solution of Nitr,
 Fix.
 Gas Sulphuris.
 A Spirit distilled from
 Wood Soot.

Many

Many of which Liquors will dissolve the lighter Chalky-Stones out of the Bladder, such as I had given me by that very able Surgeon Mr. *Freke*; but others that I had of that Master of his Profession. Mr. *Chefelden*, and of the ingenious and worthy Gentleman the Rev. Mr. *Hales* (who has carried this Matter about the Stone further than all others,) were of a prodigious Hardness, some of which looked like a polished Marble when sawn asunder, and which required the strongest Spirit of Nitre to dissolve them.

Portland-Stones, Pebbles, Flints, and Marble may all be dissolved in some time by a mild Menstruum, which the Stomach or Bladder could endure; but the Animal Mucus in the Calculus, which is one of its component Parts, hinders the Action of the stimulating Menstruum, and thence prevents the Dissolution of it.

The Attempts I proposed were all by Injection into the Bladders of Dogs, &c. which will bear all the Liquors just mentioned; for to attempt by the Mouth, and

go the Circulation, to me seems a mere Chymæra; and all that have hitherto offered to Sale *Nostrums* to do the Work by that Means, have either been deceived themselves, or had a Design to deceive others: But altho' the Dogs bear quietly enough the Injected Liquors, I cannot advise putting the same in Practice in Persons, because of the extream Tenderness of the Parts, and the need there is of repeated Injections. The Human Calculus being put on an Hot Iron, and pressed a little by any Thing hard, tumbles to a grey Powder or Earth, which is dissolved by *Aqua Fortis simplex*.

When *Aqua Fortis* is poured on the Calculus, no Effervescency is seen; nor when *Aqua Fortis* goes on the Ashes of it.

The Calculus has no Taste.

Calculi have a Kind of Shell or Cover like Bezoar.

Calculi don't grow any harder by being kept.

Being

Being distilled, there comes forth white Flowers or a volatile Salt, and a foetid Oil, &c. which has the same Smell as Distillations of Animal Substances have : They may most properly be called an Animal Tartar; of which Nature are the Gouty Chalk-stones in the Fingers of Gouty People.

Of all Menstruums I have tryed on these anomalous Concretions, the following has the greatest Effects, *viz.* Cut our Phosphorus into very small bits, spread them on the Funnel used to let alcalious Salts run *per deliquium*, place it in a Cellar for some time, when the Phosphorus will turn to a Liquor or *Liquamen*; put this *Liquamen* into a Spoon, which hold over a Lamp of Spirit of Wine, when in time the humidity will be exhaled, and the Phlogiston or sulphureous Part will take flame, and be consumed, and there will remain an acid Liquor very pungent or sour, which being diluted by several times its Quantity of Barley-water, is the Dissolvent: This, I say, will dissolve more Stones, than all other

other mild Menstruums; yet I cannot advise going to work on the Injections; and indeed Mr. *Hales* told me he would not advise it neither.

Touching the Stone in the Bladder, it is my firm belief, that the *Matèria Calculi*, or the Matter or Root of the Stone is in all Mankind, altho' it does not actually come to be a Stone in every Person. It would be a glorious Work if any Physician, Chymicus, or others should be so happy as to hit on Means to destroy the Radix, or to hinder that propensity in the human Latèx's to run into such Concretions, which, I know one of the first *Medicus Chymicus*'s in the World is now attempting. While I attended the Colleges at the University of *Paris*, and Chirurgical Lectures, one of the first Surgeons of that City, in his Discourses related the following, viz.

That a young Woman playing Tricks with a Bodkin in a certain Part, let the same fall into her Bladder, when not lying there long, and being afterwards extracted, was found covered with a Calculous Matter.

Matter. If any one makes Water for some time into any Vessel, and only empties out the Water without washing the said Vessel, he will soon see it lined or coated with a true *Calculus*. Besides the humane Species, there are Animals in whom true *Calculi* are sometimes found, *viz.* in Dogs, Rams, Horses, and Hogs.

For the Use of Surgeons.

I Ask pardon, GENTLEMEN, for meddling in your Profession, which I do not pretend to understand; I only desire your Leave to insert here a Hint or two about some Things I have found to be Fact, which if they be of Use to Mankind, I have what I propose.

I.

It is sometimes found difficult to stop the Progress of Mercurial Medicines in a Salivation; the following has been found to succeed better than other Things, *viz.* To give two or three Grains of *Aurum Fulminans* made into a Bolus with any Conserve

O

once

once a Day, and to purge a little with the true *Sal Glaub.*; for Mercury runs greedily into, or joins with Gold, which is evident from many chymical Experiments. This *Aurum Fulminans* given in any higher Degree, will beget great *Tormina* in the Ventricle, and Intestines; but especially in the former: I mention true *Sal Glaub.*; for almost all the Salt vended under that Title at present is a false Preparation; and indeed it is a shocking thing to consider the dangerous Practices of the *Falsarii* of the present Time, among whom it is the sole Study to adulterate and sophisticate in the Preparation of Medicines, both Chymical and Galenical; about which I have talked with several of the learned Members of the College of Physicians, and concerning which I may say more in due time; as well as on other Male-Practices exercised in Eatables and Drinkables. Mercury well divided will Salivate. *Æthiops Mineral* is thought by some to be trifling, and not to enter the Blood; but it has been found that being taken by a Man having a Plaster

a Plaister on his Leg, that the Mercury was found adhering to the Plaister.

II.

Touching a true Dissolvent for the Cerumen Auris.

I have found by Experience that warm Water does readily and entirely dissolve it; for it is a kind of Animal Soap: Water therefore is more proper for this Use in the Ear than Oil.

Highly rectified Spirit of Wine has generally been directed to preserve *Cadavera*; but I have found that if used so strong, it shrivels, contracts and spoils them; and that a Mixture of three Parts of Spirit of Wine, and one of distilled Water does best for the Purpose.

III.

To cure Burns without suffering Pain.

The curing Burns without Pain, to some, I doubt not, will sound strange; which, however, if the Burn don't happen on the Trunk of the Body, or Head, will be found to be fact, *viz.* as follows: As soon

as a Burn happens to any of the Limbs, suppose a Hand, or Foot, let the Part be immediately put into a Vessel of Water; and if it happens in the Winter, let a little warm Water be added to the cold, to take off the great Coldness, and to bring it as near as can be to the State of Water in the Summer, whereon the Sun don't shine; for if the Water be too cold, the Person will be uneasy: Again, Care must be taken, if the Thing happens in the Summer, and, indeed, the Winter too, that the Water does not grow warm by continuing the Limb in it; for if it does, the Patient will be made uneasy from that reason, which must be remedied by prudently adding now and then a little cold Water. In this Posture very little or none of the usual tormenting Pain will be felt, which shews that the Air is the Cause of the Pain. In this Manner the Part must be held four or five Hours, taking it out now and then, to feel whether the Pain be gone, which if not, it must be put in again;

again; but if it is, proceed to treat it with the following Unguent.

Recipe Ol. Olivæ. Unc. Quat.

Ceruss. Unc. unam.

Axung. Porcin. Unc. unam.

Sperm. Ceti, Unc. dimid.

Ceræ Flav. Drachm. duas.

Vitel. Ovor. duor.

Powder the Ceruss, and boil it in the Oil till dissolved, and it is transparent, then stop; for it must not be thicker than a Syrup, or Turpentine; then add the *Axung. Sperm. Ceti*, and Wax, stir it well till cold, then beat it in a Glass-Mortar with the *Vitell. Ovor.* or instead of the *Ol. Olivæ.* may be used *Ol. Hyper.*

For a Burn communicated by the celebrated Author mentioned below, of Amsterdam.

Take Spirit of Earth-Worms made with rectified Spirit of Wine twelve Ounces, Camphire two Ounces, mix.

No sooner is a Bandage or Compress, dipped into this Spirit, applied to the affected

fectured Part, but it will give instant Relief, and so effectually check the Inflammation, that it will creep no farther; but the Application of it must be continued till the Pain be quite gone, and the Ulcus, if there hath been any, is dried up.

If the Exulceration is got deeper, and the Wound must be kept open, two Ounces of Camphire dissolved in *Oleo Hyperici*, mixed with a Pound of the common *Unguentum Cerussæ*, applied according to Art, will quickly and effectually heal it, as I have often experienced. *Abbertus Seba.*

BEING solicited very much by many of the Gentlemen of the ingenious Profession of Painting to find them a florid lasting green Colour, in which respect the World was always deficient, I worked hard on that discovery jointly with a Virtuoso, which at last was accomplished; as were likewise some other Colours accounted by Artists to be useful. And while I was on these Searches, the House-Painters believing I knew the Nature of Colours, applied

applied themselves to me for help in the deplorable Cases many are under from the Use of their Colours. This excited me to a thorough Search into all the Ingredients or Preparations used in their Business, whereby to come at the Knowledge of their Enemies, which I find to be seven, of which two Mercurial, one Arsenical, and two of Lead among the Portrait-Painters, which they using in small Quantities and little Dawbing, no Mischief arises to them; and in the Hands of the House-Painters four, viz. two of different kinds of Lead, red and white, one Mercurial, which is the factitious Cinnabar, and one of Verdigrease: From the red Lead and Cinnabar they receive hurt; but the source and chief Spring of their Destruction comes from the white Lead, and the Verdigrease, which containing either a Mercurial or Arsenical Principle, cause Gripings, stop the Excretion both of the Fæces and Urine, bring on Spasms, Tremblings, difficulty of Breathing, Suffocations, excessive Vomiting, Irritations to Stool, and Ulcers in the Intestines,

testines, &c. with Lameness, which terrible Effects fall on the Colour-Men, also Verdigrease-Makers, Makers of white Lead, those who Tin over Metals, Plumbers and Painters, among whom I have met with sad Objects; but none so bad as the Plumbers and Makers of white Lead. The bad Effects of the Verdigrease and white Lead are such, that one of the best Artists in Colours I have met with, told me, that a Cat cannot live long in his House, but all die by those Ingredients: And I saw an Experiment made in the *Rue St. Honore* at *Paris* by a Virtuoso, who placed a Pidgeon in a Cage, which stood on the Window of a Colour-shop as far as it could out to the Street, when notwithstanding all proper Care was taken to feed him, &c. he soon drooped and died. Verdigrease, or the green Colour is very much used in *Holland*; for in and about *Rotterdam* a Man scarce seeth any other, and where the People who work therein are very wretched; which also is much used in the *West-Indies*, on the Vessels, &c. that

that go to Sea. The Case of poor Workmen occuppyed in these Things is very hard, and no great deal is to be done for them; however, I have seen some good Effects from the following Preventatives, and Methods of Cure, *viz.* Let the Plumbers, and those who tin Metals over, procure a large Sponge, which let them fill with Water, or one part Vinegar and three parts Water, squeezing it afterwards gently out; and by means of two Strings conveniently tyed thereto, let the same be fixed over the Mouth and Nostrils, which will greatly hinder the noxious Fumes from entering, and which Practice I have found of great Use in a chymical Elaboratory when we have to do with acid Spirits, or mix Sublimate with the Mercury for Calomel, &c. Let also the same Method be used by the white Lead Makers, Makers of Verdigrase, Colour-Men, and Painters; and let all these Artificers procure Gloves to be made of Bladders, which let them dip in a Mixture of Vinegar and Water as before-said, and wear

the same while at Work, which will keep off the Evil much longer.

As to Methods of Cure, Professor *Hoffman*, first Physician to the King of *Prussia*, and one of the first Chymicus's in the World, advises, if Cholicks ensue from the white Lead and Verdigrease, to use Glysters of Oil, Butter, or fat Broths, and to give Oils internally, or melted fresh Butter; then to drink warm Water till the Patient Vomits. If Palsies come on, to bathe in Baths of warm Water, and to continue a Milk Dyet: And great Care ought to be had, that the Oils given be fresh; for I have observed that expressed Oils are noxious and unfit for Use in fourteen Days, nay, an Emulsion of sweet Almonds made in Water I have found to grow acrid in one Day.

A renowned Professor says, he knew a Woman cured of a violent Asthma contracted from white Lead, by drinking Vinegar.

But I have thought of a better and more sure Cure than all this, which is to send the

the white Lead and Verdigrease to the Bottom of the Sea, or never to use them; in lieu of which, I am certain from Experiments, that a good innocent green Colour is to be made; and I would for the Good of the poor Sufferers, bestow pains to produce them a white preparation instead of the poisonous white Lead.

Ramazzini has spoke admirably *de Morbis Artificum*, and better than all others I know of; but I have not met with any in the profession of Physic or Chymistry, who have fully examined the Nature of Colours as to Health.

An Account of other Workmen destroyed in their Health, many of which not thought of by Ramazzini, viz.

Those who make Shot of Lead. Those who work in Arsenick. Founders, from the Fumes of Metals. Chymists, from acid Spirits. Those who make Looking-Glasses, from the Mercury on the back of them. Guilders, from the Mercury they use. Refiners, from the great Quantity

of *Aqua Fortis* they use. Glas-house Men, from their vast Perspiration; for tho' it be proper we should lose two Pounds of our Weight by natural Perspiration when we are in Bed, these Men are hurt by their's, which amounts to near four Pounds, which is the Case of the People in both the *Indies*, where few live to be old. Those who dig in Mines, from the bad Effluvia. Those who work in Cole-pitts, from the Steams and Damps, and where the Accidents would make a History. People that are much in Fermenting-Vaults of Wine or Ales, from a subtil Acid. Those who Silver over Metals, now called *French Plate*, where the Mischief proceeds from the Mercury they use. Those who work much in Tin, which when heated sends up an Arsenical Fume. Those who make Bismuth, likewise from an Arsenical Principle. The Dyers may receive Mischief by the Blue; for Indigo has a noxious Principle in it. Those who work much in Charcoal,

which

which gives an acid Fume not unlike *Aqua Fortis*, or Spirit of *Nitre* :

If a Person should set a Chaffing-Dish of Charcoal in his Room, and hang a Blanket against the Door and Chimney, and go to Bed, he wou'd be found Dead in the Morning. It is to be observ'd also that if a Person shou'd go to Bed in a Room newly painted Green, he wou'd be found Dead in the Morning too, which proceeds from the Acid of the Verdigrease that coagulates the Blood in his Lungs. Likewise are Printers hurt by the Letters they handle ; because they are made of *Regulus* of *Antimony* and Lead, which Lead, as as aforesaid, abounds with *Arsenic* or *Rats-bane*. There is another kind of Workmen likewise hurt in their Health, viz. the Stone-cutters ; for the more subtil part of the Powder that flies gets at their Lungs.

The Directions given heretofore to guard Painters, &c, and against Mischief may most-ly serve here. I would add one Observation more here, and that relates to Employes that oblige People to sit very much, who are certainly

certainly hurt thereby ; for Motion is absolutely necessary to Health and Life ; even incurable Piles themselves have been known to be brought on by much sitting. The Exercise of Walking is better than Riding, for Riding occasions a Person to be Costiff, and that from making the Fibres turn upwards.



M A N Y

M A N Y U S E F U L
D I S C O V E R I E S O F A R T S

O F R E A L

Benefit to the Publick,

That occur'd to the AUTHOR during
many Years Researches in Chymistry.

I.

*To preserve Sperma Ceti white, for the Use
of Druggists and others.*

T A K E highly rectified Spirit of
Wine, that is, of Malt, put there-
into the *Sperma Ceti*, let it remain in about
half an Hour, shaking it often about, pour
the Spirit off from it, and lay the *Sperma*
Ceti

Seti upon Paper to dry in the Shade: This same Spirit of Wine will do for two or three Parcels of *Sperm*; and then, if it be distill'd up in *Balneo Mariæ*, it will serve for the same Use again, and so on for a considerable Time; and if it is at last distill'd up in the *Balneo* as aforesaid, it will serve for most Extractions, such as Colocinth, Jalap, Scamony, Agaric, Ellebore, &c. or to burn in a Lamp.

II.

To binder the Offence in Back-houses.

Let a Peck of unslak'd Lime be thrown down, which will have the desired Effect; but first mix with the Lime an Ounce of Pearl-Ashes or true Pot-Ashes, and half an Ounce of Oil of Vitriol.

III. *Lasting-Writing.*

Write upon white Paper with a good black-lead Pencil, then take the White of an Egg, beat it out with a whisk, as is done for clarifying Syrups, with which
cover

cover the Writing thinly over, then place it in a Tin or other Vessel swimming upon hot Water, by which the Egg will be dried. This writing cannot be discharged by any acid Spirits, without destroying the Paper, neither will any time obliterate it; whereas all kinds of Ink will be lost by Time; even by carrying Writings to Sea, they will be in a great measure lost; so will Lancets, &c. become rusty; which proceeds from the saline Points carried about in the Air: for we see, that Sea-water thrown upon Writing will totally discharge it. Inks are readily discharg'd by all acid Spirits, and particularly by Spirits of Salt: It is with this, without its flowers, that Knaves have discharged Writings, and not *Aqua Fortis*; for that leaves a Yellowness that is seen; when they have taken out the Writing, they make the Paper bear Ink again for their ill purposes, by applying to the parts a Mucilage of shreds of white Leather boiled strongly in Water. Having been asked by Ladies sometimes, what wou'd discharge Wine out of Linnen, I

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inform'd

inform'd them that Stains of Red Port are discharg'd by Spirit of *Sal Armoniac* ; and Wax, dropt on any Garment, is taken away thus, *viz.* Wet a Rag with Water, put into it Embers of Wood, cover it by folding the Rag over it, touch it to the Wax, and it forthwith goes off.

IV.

A durable Writing another way.

Let an Ink be made with the *Gum Arabic* dissolved in Water and finely ground burnt Ivory, and write therewith, which acid Sprits cannot discharge ; and to secure it against attempts by hot Water, &c. the Writing may be cover'd with the beaten White of Egg, as aforesaid.

V.

To render Cordial Waters soft and mild.

When the Cordials are made, put them into flat Pans, the same Women bake Puddings in ; set them in a pretty large Room, where there is no Fire, where let them stand 48 hours, when they will

will let fall a little sediment, which is a small precipitation made by the Humidity in the Air, from which you may pour the Cordial Waters off, or crane them, and philtre the last three or four Ounces; this Process carries of the most fiery active parts, which is perceiv'd when Cordial Waters are drunk.

VI.

An admirable Cure communicated to the Royal Society of *London*, by a Member thereof against a sore or swel'd Throat, or Quinsy, *viz.* to eat black Currans, or swallow the Juice, or a Jelly of them; or if these can't be had, a Decotion of the Leaves or Bark of this Shrub. Note the Jelly fails in its Virtue in a Years time.

VII.

An Oil for Clocks, Watches, and other Machines.

It is generally complained by Watch-makers; that in Cold Weather the Oil congeals in the Works, and obstructs the Motions; to remedy which, proceeds thus;

Look into a Jar of Sallad Oil in Winter, when it is frozen or congeal'd, and there will be found in the middle of it about a Pint and a half, or a Quart of Oil that is fluid or uncongealed, and which no Cold in this Climate is capable of Freezing, which may serve for the purpose for Watch-makers. Again, it is complained by these Artificers, that their Oil generally growes thick or viscid about their Works, and so impedes their Motion ; to remedy which, let an Oil be pressed out of *Behn Nuts*, which is of a prodigious lasting Nature, and doth not alter, corrupt or spoil in many Years ; I kept and observed it 14 Years ; whereas on the contrary, expressed Oils, such as *Almonds*, and the like, become noxious in 14 Days. When Sallad-Oil is designed to be used, as in the Experiment about the Jar, the Artificers ought to desire Merchants to get their Correspondents to send the Oils over hither unmixed with Salt ; for they usually mix Salt, which is to make them keep, which Salt by its acrimonious Parts corrodes their
 Machines,

Machines, and does them Injury that Way. Oil exposed to the Sun grows corrosive, because the heat rarefies or puts in Action it's innate Acid, the Principles of it being an acid Salt, Water, and a Phlogiston.

VIII.

To clean Fire-Arms in Arsenals, &c. without Filing.

Take Scales of Iron one pound, Blood-stone four Ounces and one Drachm, Emery eight Ounces, two Drachms, fine Flour four Ounces one Drachm; reduce all to a fine powder, then make a Jelly of Isinglass in Water, with which beat the Ingredients up to a Paste in an Iron Mortar, and therewith make a kind of Cakes, by putting them into Moulds of Tin or Wood, half an Inch deep, two Inches wide, and three Inches long, and let them dry in the Shade. With this you clean Fire-Arms or any Iron Utensils; which may be polished with the following, *viz.* Take Oil half a pound, into which thrust a red-hot Iron, which in some Measure
breaks

breaks its Texture, and renders it not so greasy as before; to this put half a pound of black Lead, and half a pound of white. If the Arms are designed to be laid up in an Arsenal, they may be preserved in this Manner, *viz.* Take Flowers of Zink four Ounces, Linseed Oil one pound, which boil together till the Flowers are dissolved, which must be spread upon the Arms, and let dry. The Flowers of Zink are made in this Manner, *viz.* The Zink must be put into a Crucible, and surrounded by a pretty strong Charcoal Fire, when a mealy Substance will arise to the uppermost part, which must be taken off with a Spoon: This was communicated to me by a Master of the Mines in Germany.

IX. Monsieur Homburgh, of the Royal Academy of Sciences, his Way to prevent Rusting in Iron or Steel, contrived for the French King's Arsenals.

Take Hog's Lard well cleansed, half a pound, melt it in a glazed Pot, with three

or four Spoonfuls of Water, strain it through a Linen Cloth, melt it again in the same Vessel over a slow Fire, adding four Ounces of Camphire pounded, let it boil gently until the Camphire is entirely dissolved, then take it from the Fire, and whilst it is still hot, put as much Powder of black Lead into it as will make it of an Iron Colour: Rub this very hot on the Iron or Steel.

Preserving Surgeons Instruments from Rust.

Let Oil be put into an Earthen Vessel, pour on it six times its Quantity of distilled Water quite hot, stir well, let it stand to separate again, which it will do, when separate the Oil totally from the Water by a Glass Funnevel. This Process washes out the nitrous Salt that corrodes the Instrument, after which it must be boiled like a drying Oil.

X

For the Preservation of Meat some Time without Salt.

It's done by wetting a Napkin well in Vinegar, and wringing it out, in which
the

the Meat must be wrapt; by which Means it will be kept a Fortnight or longer in hot Weather. But into a Pint of such Vinegar you must first put a Scruple of true Spirit of Kitchen or common Salt.

A Captain of an Indiaman gives the following Account, *viz.* Roast a piece of Beef at *London* half the proper Time, let the Juice run out all that while, then cover it quite with melted Suit; Roast this Beef further at the *East-Indies*, and it will be good.

A Lady from *Jersey*, gives this, *viz.* Take Veal, Lamb, &c. pull off the Blood-Vessels all you can, and the Fat, wipe well with a Cloth, strow over it finely powdered Pepper, which being roasted or boyled a Week after in the hottest Weather, was good, and she doubted not it would be so in a Fortnight. Before she dressed it, she brushed and scraped off the Pepper, and washed it; after which it did not taste of the Pepper: During the time this Meat is keeping, no Flies will come near it.

By

By the same Lady,

Take an Hare or Rabbit, empty out the Inwards, hang it up by the Head to the top of a Barrel, with it's Bottom out, then sink the Bottom into fresh Earth, it keeps three Months. No doubt the Barrel should be close every-where to keep out the Air.

XI.

Liquors grown Sour, as Wines, Beers, Ales, Cyder, &c. will be rendered drinkable, or have that Sourness taken off by putting into the Liquors Oyster-shells found on the Sea-shore, and grown white, and which are to be had at the Druggist's; which must be only broke into Pieces as broad as a Shilling or Six-pence, and not powdered, which if they are, the least Motion of the Liquors raises the Particles, and so they make them look troubled. Chalk, or other Absorbents called Testaceous, will take off this Sourness too, but they leave a disagreeable Taste behind.

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XII.

XII.

Touching true and lasting Japan.

The following Process was communicated to me by the Physician of his present Majesty King *Stanislaus*, which I have not tryed, viz. Take Umber, Litharge of Silver, red Lead, of each four Ounces, powder them and pour thereon three Pounds of Linseed Oil, and let it boil, without stirring the Ingredients with any Thing. When it is boiled and grown cold, pour the Oil off from the Powders into another Vessel: Take of this one Pound and a half, Oil of Turpentine two Pounds, or three Pounds, White Amber finely powder'd one Pound, Boil'd Turpentine one Ounce, mix according to Art for Use: This the said Gentleman averr'd would withstand hot Water, or other Tryals.

XIII.

Insects in Books that destroy the Paper.

I have endeavour'd by many Experiments to keep these Animals out of the
Books

Books by Scents disagreeable to them, of which Camphire is known to be one of the best ; however, I found it necessary to go further ; the following Machine destroys all Animal Life whatsoever ; neither can any Sperm or Eggs come to Maturity after having been put therein, *viz.* Let a Brick-work be raised in the Nature of a Furnace, fix therein a Copper-Kettle or Vessel, which fill two Parts in three with Water ; have also another Copper Vessel with a flat Bottom, so as to stand with its Bottom immersed two or three Inches in the Water ; let there also be made another large Copper Vessel, like the Head of a Still, but without a Neck, which join to the last mention'd Vessel, wherein the Books must lie upon several Foldings of Paper, to hinder them from touching the Metal ; when the two Vessels being luted, give a Fire underneath in the Furnace, which will heat the Water, and the Water will heat the second Vessel, and the Vessel will heat or rarify the Air, so as to destroy all Life. If a strong Fume of

R 2 Sulphur

Sulphur were made in a Library, it would also destroy these Animals; for if the Fume be strong enough, no Animal Life in the World can suffer it.

XIV.

Distillers often receive great Mischiefs by Fire from the blowing off the Still-head, to remedy which do as follows, *viz.* Let a Kind of Trough or Receptacle be made of Tin or Copper, which may be fix'd about the Head of the Alembic, and so as not to hinder the joining of the Head to the Still, which Trough must have a Pipe pointing off from the back Part of the Furnace, distant from the Fire-place, to which must be join'd a Receiver; so that if the Spirits boil over the Mouth of the Alembic, they will run into the Trough, and so down by the Pipe, and not come near the Fire; whereas without the Use of this Machine they always run down the surface of the Brick-work to the Fire-place, and there take Flame, which is propagated upwards

to

to the main Quantity of Spirits in the Still, and the whole takes Fire.

XV.

To guard against Mons. Dupre's ill Practice of opening all Letters, Envelopes, or all sealed Things whatsoever.

This Man could imitate all Seals and Coats of Arms in an exquisite Manner. He opened Seals by a contracted Steam of hot Water ; and the Impressions he took off by an Amalgama of Mercury and Silver ; or by striking upon the Seal with a Hammer, upon which a Bullet is first laid, and by other Methods. I must own it's a difficult Work to contrive a Cement or Plastic Compound that will withstand the Steams of hot Water ; for it looseneth all the things a Man can think of : but as I was desired by a noble Person to provide against *Dupre's* mal-practice, I worked hard for a long while, trying all the sticking things I cou'd think of, but in vain. However, still prosecuting the Search, I at last hit upon the point, which is this, *viz.*
Let

Let dry Garden-Beans be put into a Brass-Mortar, and some strokes be given them with a Pestle, when the Shells will fly off, which separate from the Beans, which reduce to a fine Powder, and pass them through a Lawn Sieve, then return the Powder into the Mortar, rubbing it till it becomes an extream fine Flour; then let the white of an Egg be beat out with a whisk, as is done for clarifying Syrups, a little of which must be mixt with some of the Flour, to make it a moist Paste, which spread upon the Sealing Place of the Letter as big as a Shilling, or the usual bigness of a Seal; then close the two Papers, as is usual in Sealing, and hold the Part close to a Coffee or Tea-pot, or any other Vessel, having in it hot Water, which will harden the Cement, so that it will never be opened by any Means whatsoever, without tearing. The Way to guard against taking off Impressions, Coats of Arms, &c. is by smoaking the Seal by a Candle, &c. which being known to many, I would not
 insert

insert it here : When the Letter is made fast by the Cement, Wax and any Seal may cover the same Place.

XVI.

Experiments to destroy Bugs in Houses.

This Matter has employed some ingenious Men, for I met with a Learned Professor of Physick and Chymistry who had been Labouring in vain on the Work seven Years, and who told me he also found *Milipedes* very hard to suffocate, which was his Methods, or Attempts to destroy them by: This Gentleman also acquainted me that if Sugar be placed thirty Feet from the Place where the Bugs are, they will run to it; where also if a Nest of Ants be laid, the Ants will destroy all the Bugs; so that if those Creatures were not troublesome Companions themselves, they would be a Cure against the Bugs. As to all the pretended Remedies or Cures against these Vermin offered the Publick daily, I perswade myself they are nothing but Frauds: I let one of those Proposers
do

do a Bed of mine, when securing a little of his Liquor, and examining it, I found it to be yellow Arsenick, and Oil of Turpentine, which if he could perswade the Bug to eat, would do; but I know he will march over that safely enough. The next famous Remedy that People spent their Money in, was Oil of Turpentine, Camphire, and Spirit of Wine, equally to be laughed at.

This troublesome Creature, we know bites some People, and others he leaves untouched; but we have no Philosophy to explain to us why he doth so; however we see from thence, that he has his likes and dislikes as well as we. I endeavoured by a vast number of Tryals to find what might be so disagreeable to him, as to cause him to keep from the Bed, which I did, by powdering most of the Things found in the Druggist's-Shop that have any Smell, making a Ring with the Powder, and putting the Bug therein; when I found that one of the Things he dislikes most is *Rus-*

sia

ſea-Caſtor ; however, tho' this be laid about the Bed, he will not quit the Place.

I then tryed Rolls of Tobacco, the freſheſt to be had ; Pellitory of the Wall, Rue, Wormwood, ſeveral Chymical Oils ; which Mr. *Bradley*, Profeſſor of Botany at *Cambridge*, ſpeaks of, but all in vain.

I then tryed to deſtroy him by Fumes, which I made firſt of Flowers of Sulphur, Filings of Steel, and Oil of Vitriol, ſetting them on a portable Iron Furnace with lighted Charcoal under it. Likewise Fumes of acid Spirits ; Fumes of Mercury, Fumes of all the Species of Arſenick, all which he ſtood boldly ; when all other Creatures I tryed were killed by ſome of thoſe Fumes, except the Ant, which is likewise a ſturdy Creature.

At laſt I tryed the following, which no Animal Life can ſubſiſt under, viz. Let Matches of Sticks be made by dipping them in Common Sulphur, ſo that they may have adhering to them four Pounds of it, which will do for ſome Rooms ;

but if the Room be of the bigness of 2000 Cubical Feet, it requires about six Pounds, which Matches must be set upright in Earth put into a large Earthen Pot, such as Trees are planted in, and set on fire in the Room where the Bugs are troublesome, stopping the Chimney, by hanging the Blankets before it, and likewise causing Blankets to be hung against the Cracks of the Door, in which a little Hole must be made, and cover'd afterwards with Glass, that may serve for a Peep-Hole to see no Mischief ensues.

This Sulphur while burning will give a prodigiouſly strong Funck, and such as will kill all Creatures in the Universe. The Work might be begun in the Morning, and by next Day the Fume will be subsided, and the Door may be opened. It would be proper to make the Fume when hot Weather comes on, and they begin to bite, and again in *September*. All Gold and Silver Laces, Pictures, or Cloaths of fine Colours must be taken out of the Room, which with other Circumstances, renders

renders it a troublesome Work ; however, I am persuaded by many Years Observations that there is no other way to help us but this Method, and the two following, *viz.* Let all Things that may be wet without damage to them, be put into the great Worm-Tub of a Distiller, or Chymist, when he has distilled so long that the Water in the said Tub is hot, by which the Bugs are killed, and their Eggs rendered abortive ; for no Animal Life can subsist in hot Water ; and the Things that are improper to wet may be put into such a Machine as is described herein for destroying Insects in Books, where also the Wood-work, or those Parts we have just mentioned to be put into the Still-Tub, may be put likewise : For which purpose the Machine must be made big enough, wherein the Air becomes so hot as to destroy Life, and yet would not damage Laces of Gold and Silver &c.

XVII. *Staining Marble Yellow.*

Put an Ounce of powdered Gumboge, into a Pint of rectified Spirit of Wine in

a clean Oil-flask set it in hot Water for three or four Hours, stopping the Mouth with Paper, where let it be often shaken, then let it grow cold, and pass it through filtering Paper in a Funnel, which affords a bright yellow Tincture. The Marble to be Coloured must be laid on hot Embers of Wood, then with an Hair Pencil mark on what Figures you would have, when the Colour will go deep, and bear polishing. In the same Manner you do red, with a Tincture of Dragon's Blood, in Spirit of Wine made as above; but the true Sort must be had.

If a sharp Liquor, such as Verjuice, be applied to black Marble that has white in it, the black is dissolved, and the white is left prominent.

XVIII.

Refining of Borax.

Wash the Tinckall first in a weak Lee of Pearl-ashes cold, then take Pearl-ashes, of which make a Lee strong enough to bear an Egg, philtre it, put it into a leaden Kettle

Kettle that stands in a Brick-work Furnace, put Fire under, and when hot, put into it near as much Tinckall as it self, stir frequently with a clean Stick to make it dissolve, boil it, and in boiling Scum it, boil near one half away, philtre, pour it into the same leaden Kettle that is first washed, cover it with Boards and Sacks, to stand warm, to shoot into Crystals, which takes a Week to do, so you will have the Crystals big; but if not kept warm, the Crystals will be less.

XIX.

Refining Camphire.

It must be mixed with its own Weight of powdered Crystal-glass, and put into a Bolthead, that is of a flattish Form, not so deep, as wide, and having a Neck equally wide all the Way up, where it must be sublimed by a slow Heat of Sand; but I should think Bakers-ashes better. This Process I had of *Scot* the Chymist of *E-dinburgh*, who said it was *Johnston's* Way,
who

who refines for the India-Company; but I never since had an Opportunity to try it.

XX.

Refining of Nitre.

Have a leaden Cauldron, put therein one hundred Pounds weight of Nitre, add Water enough to dissolve it by boiling, when dissolved, add one Pound of Alum, Common, stir well, the whole will grow clear, let it stand quiet till it is Milk-warm only, draw off by Means of a Cock into an Iron Vessel, exhale to a Pellicle, then draw it out of that Vessel by a Cock into another Lead Vessel, where it shoots into Crystals.

XXI.

What relates to Mice, Rats, Flies, Fleas, Wasps, &c. a perfect Remedy is not to be expected; but a Palliation or some Relief may be had. As to Fleas, if you boil the Leaves of the Nut-tree in Water, and sprinkle the same under the Bed, it will do a great deal. Likewise it will be found very useful if you Scatter there

there powdered Quick-lime, or a Lee of Lime. As to Rats, if a Drum be beat about the House it will make them quit it for a Time; but then they will return. One Way of destroying these Creatures is thus, let a piece of Sponge be tyed cross-ways with Pack-thread so as to Compress it, which must be baked in an Oven, when it will keep in that Form, then take off the Pack-thread, and rub it with Butter and lay it in the Way of the Rats, which being Swallowed by them, the Moisture of the Stomach will Swell it so as to kill them: And this may be done with Mice by a less Piece. If you catch a Rat, and hang a small Bell about his Neck, and turn him loose, this will have a very good Effect in frightening the rest away. It has been tried, that a Rat being catched, and his *Anus* being sewed up, so that he could not Secerne he grew so uneasy, that he fell on his Fellows and destroyed almost all of them. Again take powdered Cantharides or Spanish-flies, mix it with Butter, which the Mice and Rats eating, they will

will grow so full of Pain as to kill their Fellows, and die themselves afterwards. It is true these may lie about an House and Stink, whence some Inconvenience arises. We have heard lately of a kind of Trap communicated lately here, which has been long known in *England*, and might be improved thus; it is directed there that the Rat may fall into a thing of Water; but the Fore-legs of the Norway-rat enable him to get out of a Vessel unless he be hindered, in order to which let strong Leather be stretched upon a Board, and nailed till it is dry, with which cover a large Earthen Vessel, tying it round with a String; in which Cut so as to divide the Leather into four Flaps or Pieces, near the Ends or Corners of which lay the Bait for him to eat, so that walking upon the Leather to come at it, the Leather will let him down into the Water, and rise up to its Place, and keep him in, and this perhaps would be best done with Horse-skin. A Cat is an useful Creature; but as the He one is seldom at home it is best to Cut him when

when he is fix Weeks old, which will keep him at home, and then he won't Piss the House, which he will do if the Operation be left after that time. There is a Man in *Ireland* who makes it his Business to catch Rats, which he does by Means of about seventy Traps he brings along with him, and doubtless does a great deal of good; but to these none are Strangers.

No particular directions can be given to hinder a Wasp to Sting but what every Body knows; however if it shou'd happen, and the Sting be left in the part, it is extracted by pressing the End of a Key, or the like Instrument, upon the Place, so that it may let the Sting rise up into the Hole or Hollow of it, when by a pair of small Nippers it may be drawn away, after which the following may be applied, *viz.*

Take Oil of Turpentine, Oil of Sweet Almonds, and Tincture of Myrrhe, of each the same Quantity, mix.

The same Remedy will do against the Sting of a Bee. If a Wasp be disturbed

T

he

he leaves his Sting behind, otherwise he carries it away. If a Bug bite use the following *viz.*

Drachms.

Oil of Sweet Almonds three Drachms,
Camphorated Spirit of Wine two Drachms,
Oil of Turpentine, and Tincture of Myrrhe
of each half a Drachm.

As to Flies

As an ingress to these Creatures cannot be hind'ed, only some little help can be had. It is to be observed that among other Sweet things, these Creatures are fond of that Sweetness that is found in Sal Saturni or Sugar of Lead; therefore it is best to make a Mixture of four Ounces of Water, four Ounces of the coarsest Sugar, and two Drachms of the above said Salt, and let such a Quantity be put into several wide Mouth Vials in the Room, when they will leave all other things, and wholly apply themselves to that, and will stick therein and be Suffocated. Again if spread

spread the Juice of the Holly-berry thinly upon Paper, and strew thereon a few Grains of the Sal Saturni, and likewise a little Sugar, they will light thereon, and never can clear themselves of it, when you may do with them what you please.

XXII.

Ways to take out Spots &c. out of things viz.

Ink fallen on Linen or Paper is discharged thus *viz.* Dip the feather-part of a Pen into Spirit of Salt, and pass it over the Place where the Ink is, and as soon as it disappears, dip the Linen or Paper in Water ; but if the Paper should not afterwards bear Writing well, you must rub it first with Powder of Gum-Sandarick, which is called Pounce. Ink likewise may be discharged from printed Books in the same manner without hurting the Print ; for the printing being done with Oil and Lamp-black, the Acid can't hurt it : This must be done by true Spirit of Salt, which is not easy to be had ; but I Design in a little Time to prepare some

for myself and Friends, as I shall do various other Medicines of a Genuine and true kind. *Aqua Fortis* will likewise take out Ink; but then it leaves a disagreeable yellow Colour. Red Ink is discharged in the abovesaid Manner by true Spirit of Nitre. Iron-moulds are discharged out of Linen likewise by the above Spirit of Salt. Red Wines are discharged out of Linen by sprinkling on them Spirit of Sal-armoniac, and afterwards dipping them in Water. Milk without it's Cream grown Sour will also discharge Wines. Wax Candle is discharged thus, *viz.* Wet a Rag, put some Embers of the Baker's Oven into it, hold it to the Cloaths where the Wax is stuck in, and the Wax will pass away into the wet Rag. If Pitch or Tar be fallen upon Cloaths, wash the Place with an Ounce of strong Spirit of Wine, having in it ten drops of Oil of Lavendar or Oil of Rosemary, which will discharge it. If Grease be fallen upon Cloaths, it will be discharged thus, *viz.* Make a Laver or
Mixture

Mixture of one Spoonful of the Liqueur of the Ox Gall, and six Ounces of a soft Water, with this wash the Place, which if it should be Silk that is daubed, and it be wrinkled by the Work, you must cover Paper upon the Place, and pass a Taylor's Iron over it pretty warm, and this will make it smooth again; but not too hot, because that may make some weaker Colours fly, as the yellow, &c. If Lemon-juice fly upon a brownish Coat, the Place will be whitish, upon which if you pour a few drops of good Spirit of Salarmoniac, the Colour will return, and the Cloth will be brownish again.

XXIII.

Staining Linen to bear Washing.

Dissolve half a Drachm of Lapis Infernalis or Silver-caustic in an Ounce of distilled Water, with this Mark upon the Linen with a very small Brush, and it will be a brown Colour that never will Wash out. Juice of unripe Sloes makes a lasting Black.

Take

Take a Periwinkle, break the Shell, prick a Vein on the Back, you have a greenish Liquor, which being marked on the Linen, afterwards turns reddish, and then remains a lasting Purple. If it be desired to Mark upon Iron, it is done thus, namely, cover the Blade of the Knife with Wax, then with a Bodkin Cut what Marks you would have thro' the Wax, and fill up those Spaces with a strong Solution of Sublimate Corrosive made in Vinegar; other Marks upon Iron are made by Stamping.

XXIV.

Softening Well Water.

In order to do this, about an hundred Weight of Chalk must be put down into a large Well, which Chalk must not be in Powder, but in Lumps; because then it can't so easily rise or float. And this Chalk must be renewed about once a Year. This will greatly soften it for boiling Meat, or Washing; but the mean Secret lies here,
viz.

viz. if it be for Washing, add to it the following, that is, dissolve half an Ounce of true Pot-ashes or Pearl-ashes, which is the same Thing, in half a Pint of Water, which pass thro' a philtre, and add it to a Gallon of the 'above Water; but if it be for boiling Meat, let there be only a Drachm and half of the Pearl-ashes, which Ashes can do no harm to the Victuals: The above Pearl-ashes I have always found good at the *Green-man* in *Meath-street*; but other Sorts I have found to be adulterated by dried Kitchen Salt, which will be discovered if you sprinkle it upon a red-hot Spatula, where it will make a Noise and Crack.

There is another Way of doing this, viz by exposing Well-Water for five or six Days to the Air, which greatly softens it; but proceeding with the Pearl-ashes as just said it greatly improves the Business; for Pearl-ashes, or some other Lixivial-Salt is the ingredient in all Soaps that makes them laver or Wash.

XXV.

Smell of Paint in Rooms.

This will be taken away much sooner by proceeding thus, *viz.* Let three or four Tubs, pretty wide, be set on the Floor just by the Wainscot, and filled within an Inch of the top with Water, and if such a Tub contains eight Gallons, add to it an Ounce of Oil of Vitriol, which Water condents and retains the Effluvia of the drying Oil they Paint with, which is what gives the Offence ; for Colours themselves don't give Smells. this will have a very good Effect in three Days ; but the Water must be renewed every Day.

XXVI.

Pricked Wines.

Put four Ounces of rectified Spirit of Malt into a clean Oil-flask add to it a Drachm of Salt of Tartar, set it in warm Water to digest three Days, after shaking it,

it, of this Spirit put half an Ounce to every Quart of the Wine to be mended, when the alcalious Salt absorbs the Sourness, and a new Spirit is given,

XXVII.

Moths do great Injury to the Drapers, &c.

These fly in the beginning of *May*; the end of *July* they quit their Wings. If in the beginning of *June* you fume them with Sulphur-matches, you'll mostly destroy them. Latter end of *July* it wou'd do well to brush and sweep; but the best way is to Crumble dried Leaves of Tobacco between the Folds of the Cloth, which will keep them away.

XXVIII.

We have mentioned a Way to have Fruits in Winter, which to those well versed in Experimental Philosophy will not seem strange, yet is not known by every Body, *viz.* It is so contrived by some that there are made Receivers &c, for the Antleapneumatica that may be

U

exhausted

exhausted of Air, and then removed to another Place, in which receivers if Fruit be put in *June*, such will be good enough at the End of *December*, which will surprize many.

XXIX.

About four Years past there was much talk of a Tree in *Nottinghamshire* that made a groaning Noise, which drew together great Numbers of People, when the Owner of it fenced it about, and made each Person pay a Penny that entered. About which Tree I sent to enquire among Virtuoso's to know what it really was, who informed me, that a large Toad had got into some Hollow Place of it, and was the Maker of that Noise.

XXX.

Having visited the Coal-works at *Newcastle* out of Curiosity, I was surprised at the same. Some of these Pits are now under the Sea; and tho' begun two Miles from the Town, are now carried under
Gates-head,

Gates-head, the Suburbs of the Town; some of which are 600 Feet deep. There are 2000 Carts employed in the Work, and 120,000 Men, a Nursery of *English* Seamen. The Carts carry 2000 Weight of Coals, which they bring two Miles to the Sea-side without an Horse, because the Ground is all the Way on a descent, so that the Wheels run on wooden Grooves fixed in the Ground, which Wheels are commanded by a Man who sits behind, and lets them go, or stops them by a Pressure on them by a Machine. Into some of these Pits a Candle, &c. must not be carried, because there is a Sulphurous Gas or Steam that takes Fire, and suffocates the People. To give light therefore into the Place they make use of certain Fish-skins, which look a little lucid, and are of some small Service. A somewhat better Way than this, is to fix a large Stone to move round by a Machine, that grinds against Iron, when the Sparks flying from it give a light; but a better Still is to have several Pint white

thin Vials of the Liquid Phosphorus described herein, out of which if you pull the Cork, it is light, if shut, it is dark again, as I demonstrated several times at my publick Lectures here; and if this Preparation should decay, it may be enlivened again by more Phosphorus.

A detection of many ill Practices used by some bad People in Foods, &c.

XXXI.

The first thing I would take Notice of, is an ill Practice exercised by some in *London*, of cutting off the Out-side of Meat, when it is almost Stinking, and then rubbing the same with Blood, to make it look fresh, and pass for good Meat.

REMARKS.

Dead Animal Bodies in a putrified State are poisonous, therefore unsafe to eat.

XXXII.

Punch. This Compound is made by some ill People, by mixing Oil of Vitriol
with

with the other Ingredients, instead of Lemons.

REMARK.

This being a mineral violent Acid, may stimulate the Guts or Intestines very much, and thereby subject the Drinker to Cholics, which the Lemon, a more mild Vegetable one, may not so much.

XXXIII.

Stale-Beer. This by some is made Stale not by keeping, but by putting to it Oil of Vitriol likewise, whence may arise the above said Evils to Health.

XXXIV.

Ale, how some ripen it.

There are some ill Men who make Newberry Beer, Welsh Ale, and Nottingham Ale seem ripe in Bottles, by putting into it some Salt of Tartar or Potashes, and then adding some Oil of Vitriol, which meeting together, raise what is called a Ferment, and make it froth and seem ripe.

The

The last two REMARKS may mostly serve here.

XXXV.

There are some again who mix Whiting in making Bread, which is the Cause of having our Bread so soon dry.

REMARK.

Whiting has in it both Size and Allum, the last of which is not an Ingredient to be played with, and the first is Leather boiled to a Jelly, which afterwards by standing, putrifies, and stinks, as we see Walls do that are just Sized.

XXXVI.

That which is called by some, Raisin Brandy, is only weak Malt Spirits drawn somewhat higher.

XXXVII.

And that called by some, Apple Brandy, is only Mellosses Spirits put into Cyder Casks.

XXXVIII.

XXXVIII.

I have known some base enough to use common Vitriol, of which Oil of Vitriol is made, to make Cucumbers look Green that are Pickled.

XXXIX.

There are sold frequently eatable Things, as Ginger-bread, Images of Sugar &c. having on them what People imagine to be Gold-leaf, which is Copper beat out in imitation of it, which is a dangerous thing to eat; for if at such a time Spirit of Salarmoniack, Spirit of Harts-horn, or the like should be given such a Person, it might dissolve part of the Copper, and inflame the Kidneys; for Copper receives all Menstruums, therefore called Venus; and indeed Verdigrease which is made of Copper is so violent an Emetic, that a Scruple of it will Vomit a Dog to Death. If a Physician should be called in a hurry to a Person that has swallowed Poison, I advise him to give one or two Grains of
Crystals

Crystals of Verdigr ease, vulgarly called distilled Verdigrease ; for the Minute it is down in the Stomach it will return and bring all with it ; whereas other Emetics take some time to operate, during which the fatal Mischiefs may be done.

R E M A R K.

We have found it to be so, by trying to dissolve it by the proper Menstruums, or dissolving Liquors, and by examining the Specific Gravity.

XL.

Some there are who use the Seeds of bitter Apples in brewing Drink instead of Hops.

R E M A R K.

This is the Seed of what is called the Colocynth, well known in Physick, an harsh and coarse Purge.

XLI.

I have discovered that some in *London*, in making coloured Sweetmeats are base enough

enough to colour them Yellow with what is called Masticot.

R E M A R K.

Upon an Examination of this thing, it will be found to be Lead calcined to a Yellowness, which is a very improper Thing to be taken down into the Stomach.

XLII.

Some again colour red with Vermillion or red Lead.

R E M A R K.

Vermillion is what is called factitious Cinnabar, a mercurial Preparation, which is not to be played with, nor used by any, unless by those in the Practice of Physick. red Lead is likewise highly unsafe; or if they use native Cinnabar it is also mercurial.

XLIII.

Some are base enough to colour green with Verdigrease.

X

R E M A R K.

R E M A R K.

Verdigrease being the Product of Copper reduced to a Rust by the Husks of the Grape, is an Ingredient highly hurtful, if not poisonous, and destroys the Workmen who paint with it, without taking it down into the Stomach.

XLIV.

Some colour yellow with Gumboge dissolved in Spirit of Wine.

R E M A R K.

Gumboge is fitter for using in Painting in Water-Colours, than to be taken into the Body ; it is violent both by Vomit and Stool, and by its Acrimony occasions an insupportable Drought in the Throat ; therefore all Persons ought to beware how they play Tricks with it.

XLV.

Coffee. This by some is adulterated many Ways, viz. some roast with it Pease, or Horse

Horfe Beans, and greafe it with cheap Butter; others do not roast it above half enough, that it may weigh the more; but then it is of an unpleasant Taste; these are Frauds on the Pocket.

XLVI.

Chocolate. This some do not roast near enough, that is may weigh the more, and grind therewith Flour; which is a Fraud also on the Purse.

XLVII.

Tea. Some dissolve *Japan* Earth in hot Water, and mix with *Bohea Tea*, whence it gives a higher Colour in drawing.

REMARK.

That called *Japan* Earth is Catechu, an inspissated Juice from the *Indies*, used to cure Fluxes of the Belly, and Catarrhs, but not to be played withal.

XLVIII.

Green. This by some is mixed with wild Angelica, or some other dried Herbs, which they think will be the least discovered; a Fraud on the Purse.

XLIX.

Wine. In this there is a sad Adulteration by some, and chiefly in the Port, which is mostly called for in *England*, and so much in use, that *Portugal* itself cannot supply half what is wanted, and who will not let us have their whole Product neither. In many Inns in the Country there is only found a compound *Wine*, made or brewed by Artists in *London*: Red is made of some white Wine, some Cyder, some Melosses, and coloured with Juice of Sloes: If white be scarce, it is made of Cyder and Melosses Spirits; which are Frauds relating to the Purse: But what touches Life and Health, is a bold and shocking Practice, exercised by some,
in

in clarifying *Wines* with Ratfbane and white Lead.

R E M A R K.

Ratfbane or Arfenic needs no Comment, every one knows its direful Effects: White Lead contains in it an arfenical Principle, and is near as destructive as the Ratfbane, and which Ingredient destroys the Workmen that make it, and those that paint with it.

L.

Others put Madder and Salt in Ales, which Salt is to make it bear a Head, as 'tis called.

LI.

There is a Drink sold that is called Two-penny, which by some ill People is sometimes mixed with *Indian Cockles*, which makes this Drink get sooner up into the Head, and intoxicates the Drinker, which is very dangerous.

R E M A R K.

The *Coculæ Indicæ* are of a poisonous Nature, and of much the same Kind as
Nux

Nux Vomica, *Semina Hyosciami*, and *Staphidis Agriæ*, all dangerous Things. I hope these Enormities have not reached Ireland yet.

LII.

Hair is blackened thus, viz.

Diffolve an Ounce of the finest Silver in about two Ounces, or more of *Aqua Fortis*, to which put twelve Ounces of distilled Water, when the Lock of Hair must be laid on a Board, and wetted with it, and tied up in Paper, taking Care the Neck be not touched by it. As Hair grows, it must be done afresh.

LIII.

For Cattle making bloody Urine.

Take dried red Roses, two Drams, Mutton-suet, three Drams, Wax, half an Ounce dissolved in Sweet Oil, Cyprus Turpentine, Mastich, each two Drams, Crabs Eyes, a Dram, which give by Way of Drench in warmish Water, as often.

ten as need be. As the bleeding proceeds from either eating the black Thorn, too rank Grass, or being over-driven, the Causes must be avoided. Care too must be had that they don't get at Sorrell.

LIV.

Iron is blackened thus, viz.

It must be held in the Focus or Point of the Flame of a Candle till hot, and then rub thereon black Rosin, which holds a good while ; but no one yet in the World can blacken Iron to be lasting ; and indeed, I doubt whether it will ever be done ; but I believe an other Metal might.

LV.

It is well known that Silver - hilted Swords blacken and spoil Cloaths, and that Heads of Canes of that Metal do so by Gloves, &c. but upon Examination it will be found that the blackness does not proceed from the Silver, but from an Alloy or Admixture of Copper that is in it, and
that

that if it be purified well, it will not have this disagreeable Effect; and indeed we see that tho' *Lapis infernalis* is black, yet if the Silver be pure it is lightish. Gold Heads of Canes also blacken; but this is also from Copper in it, and if pure it will not do it; but as pure Gold is too soft and pliable for Utensils or Coin either, Copper is mixed therewith to give it an hardness.

LVI.

Death-watch.

This is a little ticking Noise that has often been hear'd in Houses, which has affrighted some People, as tho' it was a thing Ominous; but being well looked into, it is only a certain He Worm courting the She.]

LVII.

When the Flint and Steel are struck together, and held over a Sheet of white Paper, and you look upon that Paper afterwards with a Microscope, you will see
little

little Particles of the Steel that have been actually melted during the Friction, and these Particles flying hot into the Pan of the Gun, are what occasion it to explode.

LVIII.

If a putrified Dunghill be viewed with a Microscope, there will appear seemingly perfect and beautiful Plants.

LIX.

If a Dot be carefully made with a Pen upon Paper, and viewed with a Microscope, it will not be round, but will be seen to have Variety of Strokes or Branches proceeding from it.

LX.

If the Legs of a Fly be viewed in the same Manner, it will be seen that he has curved or crooked Claws, which is the reason that he can run up Glass that stands Perpendicular; for he sticks those Claws into the Pores of the Glass.

LXI.

An Observation, *viz.* A Girl swallowed a Pin, she was sickly and pined three or four Months, when a Tumor arose on the Small of the Back by the Kidneys, and the Pin came out there. Another swallowed a Bodkin, which came into the Bladder; but neither of these can be accounted for by the Surgeons. Another Girl swallowed a Pin, which made it's Way thro' the Guts, and came out at a Bubo she had in the Groin.

LXII.

Another Observation. Another swallowed a Pin, when an Emetic of *Sal Vitrioli* being given, the Pin came up with a bit of Flesh on each End. At other times, I have known of three Examples of Pins being swallowed, where they passed without any harm; and indeed I advise all Persons if such a thing should happen, to do nothing at all. At another time I have known of a Bone that stuck in the Throat
of

of a Person, whence it was thrown by an Emetic.

LXIII. *As to Spiders.*

They have been thought by many to be poisonous; but to prove the Contrary of this we would acquaint our Readers, that not long since there came a Man to the Royal Society at *London*, who offered to eat as many of them as they would have him, which he did of the large House-Spiders, and received no harm, *Fungebantur aliquo modo officio cantharidum quò ad priapismum.*

It is to be noted notwithstanding that the little black Spiders that run upon the Ground in the Fields are noxious. Some Spiders as well as the Tarantula have eight Eyes.

LXIV. *An Observation.*

Mr. Trotter Surgeon to *Price's* Regiment at *Edinburgh*, related the following, viz. that having cut off a Man's Foot, a Stander by ran a Pin into the fleshy Part

of it, when the great Toe contracted it self, which Motion did not proceed, as he said, from any mechanical Reason, but from an actual Sensation of Pain, because of some remaining Circulation.

LXV.

The Farmers receive great detriment by the Blacks that come into the Corn, against which divers Methods have been tryed both in *England*, *Scotland*, and here, namely, by putting several things into the Earth when they Sowed, and by preparing the Corn; but all in vain. The only thing that can be done is this, *viz.* to let two Men hold a long Rope in their Hands, and draw it along against the upper Part of the Stalk, so as to make it bend down a good Way, which will fling off the wet or drops of Water that lies there, which does the Office, as it were, of a Lens or burning Glass, upon which the Sun shining, the Heat is reflected, whence a Calcination or Combustion of the Corn ensues. This Practice

Practice I had not known to be exercised
in *Ireland* when I printed my Proposals;
but I hear since it is known to some.





A N
A C C O U N T
O F

Some A T T E M P T S, to
make distilled Sea-Wa-
ter wholesome.

LXVI.

IT is well known that seafaring People, especially in long Voyages, frequently suffer great Inconveniences, when their Provision of fresh Water, either by long Calms, contrary Winds, Storms which disable the Rigging of their Ships, or other unforeseen Accidents; which

which obliges them to come often to a very short Allowance; and sometimes to lose the Benefit of their Voyage, by changing their Course to get at fresh Water: Or if they happen to be provided with a Still, then, by drinking unwholesome distilled Sea-water, their Healths are greatly indangered, by the most obstinate and incurable Obstructions, Scirrhus Tumors, Cachexies, &c. as I have been assured, by those who have known by Experience, the ill Effects of it.

There have both in *England*, *Germany*, *France* and *Holland*, been several Attempts made, to make Sea-water more wholesome. The *Lapis Mexicanus*, or a soft filtrating Stone in the shape of a large Mortar or boiling Copper, is very much in use among the *Hollanders*; but will not answer the end. It clears the Water from Mud, but will not quite clear it from the Salt and bitter Taste. Sea-water being filtrated through Stone Cisterns, the first Pint that runs through will be like pure Water,

Water, having no Taste of the Salt, but the next Pint will be as Salt as usual. The *Comte de Marfilli* in his *Histoire Physique de la Mere*, says, he filtrated Sea-water through fifteen earthen Pots, placed over each other, which were filled and tried first with Garden Earth, and then with Sand; but it had very little effect, tho' the sum of the Depth of all the Pots was sixty five Inches; the Sand did best. It has also been attempted by several ways of Distillation, as also by Precipitation, both with and without Distillation, which was attempted with Alkaline Powders, as Coral, CrabsEyes, &c. with Salt and Oil of Tartar; and also with acid vegetables and mineral Substances; but all hitherto to no purpose. Yet this should not discourage us from further Attempts especially in a Case of so great Concern to the welfare of so numerous, so considerable, and important a part of Mankind as those are *who occupy their Business at Sea*, And whose numbers as they have within

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little

little more than a Century, greatly increased, by a more enlarged Commerce through the World ; so are they like to increase more and more in future Generations ; and That especially on the vast *Atlantick Ocean*, in proportion as the *European Colonies in America*, may more and more increase in number of Inhabitants.

But notwithstanding there have been many Instances of Peoples preserving their Lives in times of Distress, by the use of very unwholesome Sea-water ; yet I find the mention of any Endeavour to make it more wholesome, spoke of with Scorn and Contempt by some, as a useless Attempt. Some who belong to large Ships with numerous Crews on board them, are apt to say, where can we have or stow sufficient Fuel, to distill, for the support of Such numbers ? Yet we find, that in *Queen Elizabeth's* time, *Sir Richard Hawkins*, who then commanded a Fleet in the *Indies*, did, when Water had failed them, for many Days, even in the Admiral's Ship,

Ship, procure by Distillation a sufficient quantity of fresh Water to sustain the People. See Dr. *Shaw's Abridgement of Mr. Boyle's Works Vol. III. p. 220.*

And a Person told me, that on board an *East-India Ship*, in which he was, for want of fresh Water, the Ship's Crew was sustained fourteen Days, with distilled Sea-water, which they distilled off at the rate of ten Gallons in a Day. The Instances of being brought to a very short Allowance of Water, are, as I find upon Inquiry, very frequent; I am informed also that many perish at Sea for want of fresh Water to drink.

With a Still that holds thirty Gallons, Water will distill at the rate of fifteen Gallons in seven Hours, which take up half a Bushel of *Newcastle Coals*; but in a larger Still more will be distilled in equal time, with less Fuel, in Proportion to the Quantity distilled. Therefore thirty-six Bushels or a Chaldron of Coals will distill 1080 Gallons, Wine Measure, that is,

above four Tons, or near three Tons Beer Measure. And as a Chaldron of Coals weighs about a Ton and a half, and a Ton of Water; *Winchester* Measure 2816 Pounds; hence it appears that Coals will distill about three times their quantity or weight of Water. And if fifteen Gallons can be distilled in seven Hours, then fifty-one Gallons may be distilled in twenty-four Hours; a Quantity sufficient for a great Number of Men; which might also be much increased, by beginning the Distillation some Days before fresh Water is wanted.

And as a Scarcity of Water, can in most Cases be foreseen, for some time before; so the Distillation of Sea-water may be begun some time before it is wanted; suppose but a Week before, then in that time, a great Quantity might be provided by Distillation. Suppose but ten Gallons were distilled in a Day and Night, as in the Case of the *East-India* Ship above-mentioned, that would come to seventy Gallons in a Week;

Week: And suppose it be fourteen Days more before there be an Opportunity to provide fresh Water at Land; then by keeping the Still going there will be two hundred and ten Gallons distilled in those three Weeks. A Provision of fresh Water, which will be sufficient to supply a considerable Number of Men for that Time. And where the Ships are larger, and the Crews more numerous, a proportionably larger Provision may be had for a sufficient Quantity of distilled Water for their Use. But as the much greater Part of Merchants Ships, have not many Men on board them, so it will be the more easy to find Means to supply them with distilled Sea-water in Cases of Distress.

I have made these Estimates of the Quantities of Water that may be distilled, only as a Foundation for those concerned in Shipping and long Voyages, to make their Estimates from; For as the Circumstances of the different Sizes of Ships, and Number of Men, and different kinds of loading,

loading, and different lengths and natures of Voyages are very various, so those concerned can best judge, what Provision of Fewel, and what size of Stills and Worm-Tubs will be requisite.

If the Kitchen Boiler, when not used for Cookery, can be made use of for a Still, it would be very commodious, as not requiring a separate Fire-place, and Still. This I have seen put in Practice in private Families, by having a separate Cover which fitted the Boiler well, with a close Joining, In the midst of which Cover, was a Hole of a due Proportion to the size of the Boiler, to which Hole the Pewter-head of the Still was aptly fitted, and the Joinings closed with a stiff Paste made of Bean or Wheat-flour, with Whiting or Chalk wetted with Salt-water. And these Ship Boilers being made narrower above than at their middle, a Still Head may the more easily be adapted to them. And there being two Boilers in the Kitchens of several Ships; for greater dispatch, they
might

might either use them both in distilling at the same time, or might, if need require, provide hot Water in one, while not used in Cookery, wherewith to fill the distilling Pot when wanted, which would much forward the Work. If there be room but for a small Worm-Tub, the Water in it may be changed the oftner, as it grows warm, it being easy to pump it out, and to pour in cold Water. As to Mr. *Hauton's* contrivance to save the having a Worm-Tub, by causing the distilled Water to pass by a leaden Pipe through the side of the Ship into the Sea, and then being cooled, to return into the Ship ; this Method seems liable to too many Objections to be put in practice. See *Lowthorp's Abridgement of the Philosophical Transactions. Vol. II. p. 297.*

If a Still is purposely bought for this use, I believe it would be most adviseable to have the Pot or Boiler of Cast Iron, but especially the Head of Pewter ; because I suspect that when Salt-water is boiled in
a Cop-

a Copper Vessel, the heat may make the Salt more corrosive, and thereby more apt to produce, and bring off *Verdigrease* from the Copper, which would make the distilled Water apt to cause nauseating of Food, and sometimes Vomiting; which as I have been informed, has happened to the Inhabitants of *Antegoe*, where being in great distress for fresh Water, of which they have none but Rain-water, they had drank for some time distilled Sea-water; which obliged them to disuse their *Stills*. I hope the following Method of preparing distilled Sea-water will be of use to them in long Droughts, when Rain-water fails them.

For the same reason also it is advisable to have the *Still* Head of Pewter, and not of Copper, which may probably contract a green Rust, in laying long by, in the salt Air at Sea. This is what a person told me had happened to him at Sea; the Water which was boiled in his Tea-Kettle, causing him and several others who drank

drank of it to vomit, which was occasioned by a green Rust in the Neck of the Kettle ; and I have heard of several other the like instances. In answer to this, it may be said, that Salt Meat is frequently boiled in Copper Vessels witho it any such ill effects. But then the Salt is somewhat sheathed in the unctuous Fat of the Meat, whereby its corrosive Acrimony is much abated. I mention the providing Iron and Pewter Stills, rather than those made of Copper, only by way of precaution, being not certain whether those of Copper will have any ill effect, provided they are made very clean ; for it is found by Experience, that if Sea-water stand any time in a Copper Vessel, it will much sooner cause a greater Rust than Rain-water will.

I am informed that the Wood Fewel is chiefly used in ships, which in many Ports abroad costs nothing but the labour of cutting and fetching : A greater bulk of this will be wanting to distill any quantity of Water, than there will of

Coal to distil the like quantity. Coals might well serve for Ballast in a little compass ; but when Ships are full freighted they have little or no Ballast, which is then not to be come at.

But might it not be adviseable in some kinds of Voyages, by way of precaution, to have a Ton, or other quantity of Coals, in some proper place, when it would take up but little useful room, especially since so many Tons of Water may be distilled with one Ton of Coals.

I found by filling a Cask with Coals, strake Measure, which held twenty-seven *Winchester* Gallons of Water, that though the Coals are about one fourth part specifically heavier than Water, yet the Water weighed one eleventh part heavier than the Coals.

I have been told, that where there has been occasion to keep a Fire for many Days and Nights continuance on Ship-board, for distilling of Water, they have by way of precaution from danger of Fire, laid a quantity

quantity of Salt on the Planks about the Fire-place.

Here will be no danger of firing the Ship, if the Still Head should fly off, because Water will not flame, as distilled Spirits will do.

II.

THE particular occasion of my engaging in this Attempt to make distilled Sea-water wholesome, was from a Conversation I had with some seafaring Persons, who were giving an account of the very bad stinking Water they were obliged often to make use of at Sea, and of the great hardships they sometimes underwent, for want of enough of that bad Water; whence it occurred to me, that probably distilled Sea-water might be made more wholesome by Clarification, concluding, that it abounded with a nauseous Biscumen, as I remembered some Authors had said it did, and being fully possessed with an opinion that it was so, I resolved to make the trial, being provided with a Hoghead

of Sea-water, which was taken up near the *Buoy* at the *Nore*, at the Mouth of the *Thames*, by the Favour and Procurement of the *Right Hon. the Lord Vere Beauclerk*, one of the *Lords of the Admiralty*.

I distilled several Gallons of it in large Glass Retorts, pouring what came over into the Receiver, from time to time, into separate Glass Vessels, beginning the first pouring off, when it first began to boil, that I might the better know, whether it grew worse and worse, the farther the Distillation was carried on, which was sometimes done till the Salt in the Water became dry.

I found the little which was distilled off with a more gentle heat, *viz.* till it began to boil, was pretty well tasted; but the seven next separate Portions of distilled Water, had a flat, unsalt, nauseous, dry, adust Taste, and the last and ninth Portion was more harsh and disagreeable, it tasting more of a kind of Spirit of Salt; for what came over till all was distilled to a dry Salt, was in this ninth Portion; but
did

did not find any Taste like Bitterness or Bitumen. And *Comte Marfilli* observed the same, viz. that the bitter bituminous Taste of distilled Mediterranean Sea-water was scarcely discernible, when taken up from the Sea, within four or five Inches of its Surface; but if taken up at greater Depths, for the deeper the more bituminous, then he says, there is a bitter Taste, which it is difficult to free it from: For after most exact and repeated Distillations, the Water, tho' freed from its Salt, yet retained a kind of viscous glewy Matter, which is to be perceived sticking to the sides of the Bottles, when the Water is shaken, and which slowly precipitates to the Bottom when the Water is not shaken, which is not found in distilled Fountain Water. But tho' I could not perceive any thing bituminous in this distilled *Nore* Water, yet however, I clarified several Portions of it with different Degrees of Clarification, both with Whites of Eggs and Isinglass, but all to no purpose; it was indeed of a more mild, and less nauseous Taste :

Taste; but that I found was owing to the soft mucilaginous *Quality* of the Substances with which I clarified, which only covered the nauseous noxious *Quality* of the Water, but did not free the Water from it.

But having once begun, I resolved to make farther Enquiry, by what probable Means I could at first think of, or should during the Process, get any Hint of, from such Experiments as should be made. For it is by making variety of Experiments, and the light which we get, by comparing the Events of them together, that we get Hints for farther and farther Researches: Following thereby as near as we can the *Clue* by which Nature leads us into her more secret Recesses. And tho' this Business is principally intended for the Use of seafaring Persons, yet I hope, those of them, who are not used to Philosophical Researches and Reasonings, will excuse me, while I first give a short Account of some previous Experiments, which tho' they do not directly describe the best Method of preparing good distilled Sea-water ;

ter; yet may be of Service to explain the Nature, and noxious Quality of common Sea-water.

Having therefore Reason to suspect, from the Taste of this distilled Water, but especially from the last Portion of the Distillation, that there was a Spirit of Salt raised by the Heat of the Fire, and mixed with the distilled Water; I dissolved some Silver in double *Aqua Fortis*, according to Mr. Boyle's Direction, *Vol. I. p. 54.* of Dr. Shaw's *Abridgment*, and dropped sixty Drops of this Solution into an Ounce of pure distilled Spring-water, then putting about half a Spoonful of the several Portions of the distilled Water into different Wine Glasses, I dropped into each of the Glasses two Drops of the Solution of Silver, diluted in distilled Spring-water, which immediately caused white Clouds in the clear distilled Sea-water, which were least in the first Portion, and nearly the same in all the other Glasses, except the last, which had much whiter and thicker Cloud; whence it was evident, that there was
some

some Spirit of Salt in all the distilled Water; for as Mr. *Boyle* observes, if there be any common Salt, or its Spirit, in the Water into which the Solution of Silver is dropped, that Salt or Spirit immediately seizing on the *Aqua Fortis*, it lets go the Silver which it had dissolved, which is thereby precipitated to the Bottom in the Form of a white *Calx*, whereby the least quantity of Salt, or of its Spirit, is discovered in any Water; but it will not discover Nitre, Alum, or Borax.

And that there is some Spirit of Salt in this distilled Sea-water, is further probable from the following Observations, *viz.* That this distilled Water does not putrifie and stink, as common Water does; and even Sea-water, which will putrifie and stink much tho' it has Salt in it. Now I have found by often repeated Experiments, that three Drops of Oil of Sulphur, which is an acid Spirit, will preserve a Quart of common Water from putrifying for many Months; and doubtless, Spirit of Salt, which is an acid Spirit too, has the
 same

same effect. *Fioravanti*, l. 1. *Physices*, c. 95. mentions as a great Secret, that a little distilled Sea-water, mixed with common Water, will preserve it long from Putrefaction. *Du Hamel Regiæ Scientiarum Academiæ Historia*. And it is probable this, or Oil of Sulphur, or Spirit of Vitriol, was the Mixture with fresh Water, to preserve it from Putrefaction, which the *French* were said, not long since in the News-Papers, to send to Sea.

The following Experiment is a further Confirmation that there is Spirit of Salt in distilled Sea-water, *viz.* I put in two Ounces of the last Portion of the Distillation to Dryness of Sea-water a small piece of fresh Beef: And put Beef also into the like quantities of well-cured distilled Sea-water, and also of Rain-water. In seven Days the two last were become very foetid and putrid, and the Waters thick and cloudy; whereas the Beef in the very bad distilled Sea-water, did not putrifie, nor was the Water turbid, but clear as at first, though kept seven or eight Weeks

with the Flesh in it: And it was observable, that the restraining quality of the bad distilled Sea-water was so great, that it contracted the Fibres and Blood-Vessels of the Beef, so that no Blood could issue out of it as it did the first Day, from the Beef in the other Glasses, which had good wholesome distilled Sea-water, or Rain-water in them.

Now it is not likely, that an oily bituminous Substance should have this effect in hardening and preserving Flesh; the Effect of such Substances is rather to soften and promote Putrefaction. In order therefore to make some Estimate of the Quantity of Spirit of Salt that was requisite to have this Effect on Flesh, I put some Pieces of fresh Beef into several Portions of common Water, with different Quantities of Spirit of Salt, and found that the Proportion of three Drops to an Ounce of Water, would preserve Flesh from stinking for a considerable time,

The Action of Fire gives those distilled Salts, what is called a Polarity, such as
the

the Filings of Iron have ; for when attracted by a Loadstone, they stand an end, and thereby form rough sharp Points, like little Bristles : And 'tis in some such like manner, that the Particles of Spirit of Salt are to be formed, whereby they acquire a great degree of Acidity, and a restringent austere Roughness.

From this Experiment, we may plainly see, how common distilled Sea-water works its most pernicious Effects on those who drink it, *viz.* By contracting and purring up the fine Vessels and Fibres of the Body, whereby it brings on those inveterate and most incurable Obstructions and scirrhus Tumours, which are observed to be the Effect of drinking those unwholesome Waters.

It does not probably rise from the Perfect Salt which is in the Sea-water, but seems rather to be the Spirit of a more imperfect Salt, which abounds in Sea-water, and is called Bittern. Now the Spirit of this Salt may probably be raised with a much less degree of Fire, than the Spirit

of common Salt; because it wants a central Earth, which makes true perfect Salt of so fixt a nature, that its Spirit cannot be raised without being mixed with powdered Bole or Brick-dust, and distilled in a Retort with a strong melting Fire; whereas the Spirit of imperfect Bittern Salt, is more easily raised with a much less degree of Heat, *viz.* that of boiling Water.

Finding therefore so great Reason to conclude, that it was a *Spirit of Salt* which principally made distilled Sea-water so unwholesome; and it being a known thing, that Oil of Tartar, being mixed with spirit of Salt, will make true common Salt, as well as strongly imbibe the rancid Sulphur of any Liquor it is put into; I dropped sixty Drops of strong Oil of Tartar into an Ounce of distilled Sea-water, and distilled it a second time; it was well tasted, and gave no white Clouds with Solution of Silver; A probable Argument, that the Oil of Tartar had seized on and fixed the Spirit of Salt, as perhaps also some of the nauseous Bituminous

nous Sulphur, and thereby hindered them from distilling over into the Receiver. It was also the same when I distilled half a Pint of distilled Sea-water, with a quarter of an Ounce of Tartar, or with Sal Tartar. And with Pot-ash it gave no white Clouds with the Solution of Silver; but it had a very nauseous soapy Taste, which continued long after.

But two Ounces of Sal Tartar, had no sensibly good effect, when distilled with a Pint of Sea-water; and it was the same when either Sea-water, or distilled Sea-water, were distilled with decrepitated Salt, that is, Salt burnt in a Pot till it has done snapping.

Half a Pint of distilled Sea-water, distilled again with half an Ounce of Calx of Bones burnt to a white Powder, was well tasted, and gave no white Clouds with Solution of Silver; but if it be not thus distilled a second time, the Calx of Bones by standing some Days in the distilled Water, takes off much of its astringent Taste, but does not prevent its giving white Clouds

Clouds with the Solution of Silver; and whereas, had it been distilled a second time, there would have been no such Clouds; this shews that the Calx of Bones seizes on the Spirit of Salt and prevents its rising: It was very good three Months after.

Distilling a second time with calcined Oyster-shells, has the same good Effect, but tastes somewhat more Aduſt, but after long ſtanding is good.

Distilling a second time with Chalk, prevents the white Clouds, with Solution of Silver; as also with Brick-duſt, which gives a very nauſeous Taſte.

With burnt Alum, there are very ſmall whitish Clouds, and it has a ſmart dryish Taſte, but is otherwiſe well taſted, and continues ſo long.

Thus we ſee that Oil and Salt of Tartar, Calx of Bones, Oyster-shells, Chalk and Brick-duſt, have a good effect in curing the noxious quality of diſtilled Sea-water; But this, not without a ſecond Diſtillation, which ſo greatly increaſes the difficulty of coming

coming at good Water; that nothing but the most urgent necessity, could have prevailed with any to make use of either of these Means.

III.

THERE was another Method which I had thought on to try as soon as Opportunity offered, and that was to see what could be done by Putrefaction. But this, I had as yet no Opportunity of trying, because my Hogthead of Sea-water, having hitherto had its Bung-hole open, did not stink. But I was happily supplied by a Friend with twenty-two Flasks of *Mediterranean* Sea-water taken up nineteen Months before, thirty Leagues North of the Isle of *Malta*. The greatest Part of the Sea-water was Sweet, and in Taste I found no difference between that and the *Nore* Water.

I cut off the Necks of two *Florence* Flasks to a wide Mouth, and then, having weighed them both, I put into one of them half a Pound Avoirdupoise of *Mediterranean* Water, and into the other
the

the like quantity of *Nore* Water, and then evaporated them both to dryness. I found by weighing them again, that there were two Drams or 120 Grains of Salt in the *Nore* Water, viz. $\frac{1}{29\frac{1}{2}}$ Part of the Sea-water; and in the *Mediterranean* Water 128 Grains of Salt, viz. $\frac{1}{27\frac{1}{3}}$ Part of the Sea-water, it having one fifteenth Part more of Salt in it.

I distilled in a large Glass Retort fifteen Flasks of the *Mediterranean* Water, which did not stink, and I observed that during the Distillation, its smell was not so adust and disagreeable, as that of distilling *Nore* Water, the smell of this distilling *Mediterranean* Water, being mild and somewhat urinous. Hence it seems probable that by Putrefactions its Bittern Adust Salts, are changed in some Degree into a kind of Salarmoniac. For doubtless this Sea-water had putrified in nineteen Months keeping in Flasks.

I carried this Distillation on, till the Salt was dry at the bottom of the Retort; and pouring it off from time to time as it
was

was distilled into separate Vessels, I, to my great Satisfaction found, that the first four Parts in five of this distilled Water gave no white Clouds with Solution of Silver ; had very little more of the Aduſt Taſte than my Pump-water, Rain-water, or the very pure *Combe* Spring-water, with which *Hampton-Court* is ſerved; all which acquired an Aduſt Taſte by Diſtillation; and the more impure the Water, the more diſagreeable was the Aduſt Taſte, even after it had putrified and was grown ſweet, which was the Caſe of my Pump-water, which is hard, and has five Grains of Sediment in a Pound of it, evaporated to dryneſs, whereas *Hampton-Court* and Rain-water have but one Grain and an half. But if theſe diſtilled freſh Waters, or Sea-water, ſtand for ſome time, either expoſed to the Air, in open Veſſels, or in Bottles, the Aduſt Taſte is much abated and at length goes quite off.

It is obſerveable, that though diſtilled Rain-water, Spring or Well-water, have an Aduſt diſagreeable Taſte, yet the Wa-

ters which remain in the Retorts, have only the Taste of common boiled Water; which shews that the Aduſt Empireumatick Taste, is owing to the Action of Fire on the ascending diſtilled Vapours. The Sun indeed can raiſe Vapours from Water, with a very gentle warmth, and thereby give no ill Taste to thoſe Vapours, but this cannot be done by diſtilling.

And as a farther Proof of the goodneſs of this diſtilled *Mediterranean* Water; I find it putrifies and ſtinks by ſtanding ſome Days in a Glaſs Veſſel covered only with Paper, not tied down; and when expoſed to the free open Air, ſoon came ſweet again; whereas none of the *Nore* Water has ſtunk, which was diſtilled before it had putrified, and gave white Clouds with a Solution of Silver, notwithstanding it has ſtood ſeveral Months in Glaſs Veſſels covered with Paper. And raw Beef, as I obſerved before, putrifies and ſtinks in this diſtilled Water, as ſoon as in Rain-water; whereas the like Beef put into the latter part of this Diſtillation, with which a Spirit

Spirit of Salt was raised, continued hard, and did not putrify in standing several Months.

IV.

IN order further to examine into the goodness of this distilled *Mediterranean* Water, I boiled for two Hours some common yellow boiling Pease in some of it; also in distilled *Nore* Water, in Rain-water, and in undistilled *Nore* Water: The Pease which were boiled in the undistilled Sea-water, were dusky coloured, and very hard, and such are found very indigestible, by those who have been obliged to eat them for want of other Food. Those which were boiled in the distilled *Mediterranean* Water, were very soft and mellow to a Mash; those which were boiled in the distilled *Nore* Water, were soft, but not to the same degree as the other: Those boiled in Rain-water were soft too, but in a less degree than the two distilled Waters; which shews that Distillation has more effect in preparing Water to soften

Pease boiled in it, than the small quantity of Spirit of Salt in the distilled *Nore* Water had, to disqualify it for that purpose. But I found that Pease boiled in the last part of a Distillation of Sea-water to dryness, in which there is much Spirit of Salt, were far from being so mellow and soft.

I observed that when the good distilled *Mediterranean* Water had stood some Weeks, if two or three Drops of Solution of Silver were dropped into a spoonfull of it, though it did not cause white Clouds, yet in standing some Hours, the Water turned brownish, with some sediment; and I found it the same with my distilled Pump-water; also in Rain-water when tending towards Putrefaction. So that we cannot hence infer any bad quality in the distilled Sea-water. I found it the same also in the best of the sweet distilled *Nore* Water, but not in that which was the latter part of the Distillation to dryness, which abounded more with Spirit of Salt.

I observe further on this Distillation, that
when

when about two thirds of the Sea-water was distilled off, there appeared about an Inch above the surface of the distilling Water, a Circle of whitish Salt, sticking to the side of the Retort, which increased more and more, as the Water decreased by Distillation, yet no Spirit arose from this Salt, till about four Parts in five were distilled off. Hence we may observe, that this Spirit of Salt is not so apt to rise in Distillation, from the incrusted Salt, whose Water had putrified and grown sweet, as from the incrusted Salt of Sea-water that was never putrid.

The way to know when enough of Water is drawn off any one Distillation, is, from time to time, to try a little of it in a Glass, by dropping two or three Drops of Solution of Silver, as above-mentioned.

I purposely chose to make use of Glass Vessels, rather than Metalline ones, both that I might the better observe what occurred in the Distillations, and also that I might be secure that no ill Taste was given to the distilled Liquors by the Vessels.

sels. In the strongest boilings the Ebullition rises three or four Inches above the surface of the Water, so that care must be taken, not to fill the Stills so full, as to endanger the Water's boiling over into the Neck of the Still; And that especially on Ship-board, where there is more danger of the Water's rising too high, by the heeling too and fro of the Ship; to prevent which, the upper part of the Ship-boilers are made narrower than the middle parts: I never observed any scum on the surface of the boiling Sea-water.

Some of the Flasks of this *Mediterranean* Water being very putrid and stinking much, I put the Water of none of them into the Retort with the fifteen Flasks of Water: but distilled half the Water of one of the most putrid of them in a lesser Retort: The distilled water of this stank intolerably, hence the putrid Particles the most volatile in Distillation; but what remained in the Retort was the next Day sweet and clear, and had deposited a dirty sediment. And putrid Sea-water does the same,

same, as it grows sweet and clear. And common Salt also, as it melts in a moist Air, is observed to deposite much Earth, with an unctuous, sharp, austere Liquor.

The distilled Water gave brownish Clouds with a Solution of Silver while putrid; and when grown sweet again, gave white Clouds, and did not stink again in long keeping; an Argument that there was some Spirit of Salt in it. Whence we see how requisite it is to let Sea-water not only stink, but also become sweet again, in order to procure by Distillation, wholesome Water from it.

Sea-salt is observed by Chymists, to be made up of an Acid of a peculiar kind, and of a mineral Alkali, the Acid Portion being so far intangled, and involved in the other, as hardly to be able to exert its proper Virtues, in a concrete Form: But Putrefaction, that most subtile of all Dissolvents, effectually disjoins and separates all the component Parts of putrifying Bodies, except common Salt, which is of so fixt a Nature, as not to yield to Putrefaction

on

on, which is the Reason that it is so effectual a preserver of other Bodies, where there is a sufficient Quantity of it used. But there being in Sea-water not only perfect Sea-salt, but also a more imperfect Bittern Salt and Sulphurous Bittern, which last Principles promote Putrefaction, and are thereby disjoined; and after the Putrefaction ceases, are formed into new Combinations, the grosser of which precipitate to the Bottom; whereby it falls out, that the Spirit of the Bittern Salt requiring now more Heat to raise it, than before Putrefaction, a considerable Quantity of the Sea-water is distilled over, before this Spirit of Salt begins to rise. But when the Distillation is made during the putrid State of the Water, its putrifying Particles being then disunited, the Spirit of Salt more easily rises in Distillation.

I think it therefore a happy event, that some of this *Mediterranean* Water, had putrified and was sweet again; and that some of it stank; otherwise if it had all stank, and by distilling it in that putrid State,

State, I had found it no better than *Nore* unputrid Water, I might probably have been thereby so discouraged from any further Pursuits, as not to think of distilling some of it, after it was grown sweet again.

I found that the fifth Part of it, which was distilled to dryness, turned Syrup of Violets Red; which Spirit of Salt also does; an Argument that there is Spirit of Salt in this last distilled Sea-water, the Acidity of which is also very manifest to the Taste.

But good distilled *Mediterranean* Water does not change the colour of Syrup of Violets; whence there does not appear to be any prevailing Acid in it.

But neither did the last part but one of the Distillation of this *Mediterranean* Water change the colour of the Syrup of Violets, notwithstanding it gives white Clouds with Solution of Silver, which therefore discovers to us smaller degrees of Spirit of Salt, than Syrup of Violets will do. Hence we have a hint to be careful not to distil off any quantity of Sea-water too near to

the bottom, because it will thereby the more abound with Spirit of Salt, and be consequently the more unwholesome.

And that the quantity of this Spirit of Salt increases more and more, in proportion as the Distillation is carried on farther and farther, I was convinced by the following Observation, *viz.* Jan. 29th I examined a large Distillation of *Nore* Water which had not putrified, which was kept in eight separate Flasks according to the order of its being distilled off, which was done the preceding *October* 13th.

It had lost its adust Empyrume, and about one third of it gave no white Clouds with Solution of Silver, but the other latter parts of this Distillation gave very manifest Clouds, and tasted somewhat more tart and rough than the other; now this whole Distillation from first to last, gave white Clouds at first, and for some Weeks after, when I first perceived that the quality of giving white Clouds sensibly abated. This shows, that there is not much Spirit of Salt raised in the first
third

third part of a Distillation of unputrified Sea-water, and that the little of it there is, is so incorporated in the Water by long standing, that the Solution of Silver has no effect upon it. In like manner as I have frequently found, that a small quantity of Oil of Sulphur, or Spirit of Vitriol, would on long standing, be incorporated into Chalybeate Waters.

Hence we see that there is much Spirit of Salt in the latter part of this Distillation.

Hence also we may draw this useful Inference, that in cases of Distress, if there should be no Water in the Ship that has stank and become sweet again, we may with safety make use of distilled Sea-water that is just taken out of the Sea ; provided only one third part of it be distilled off ; for 'tis probable that the ill effects of distilled Sea-water have principally arisen from Men's not being enough aware of the ill Consequences of carrying the Distillation on too far.

V.

Jan. 29th I distilled 22 Cubick Inches of the *Nore* Water out of the Hogthead, which was well closed up *Dec.* the 2d, in order to cause it to putrify. Some time after the Water in the Hogthead had a disagreeable smell, and then grew sweet, and continued so to this Day. It is remarkable that with so small a degree of Putrefaction, the Water which was distilled over was good, till the Salt which adhered to the Retort had appeared for some time, whence its Spirit arose as usual. There were sixteen Cubick Inches distilled over, which were good, which is full three fourths of the whole.

Both the smell of this during the Distillation, and also its taste were much better than that of unputrified Sea-water.

December the 2d I put some *Nore* Water into a Kilderkin and bunged it up close, where after some time, it contracted a putrid smell, and taste, and then became sweet again. Some of it being distilled

Jan.

Jan. 29th, it gave no white Clouds with Solution of Silver, though above two thirds were distilled off: Hence again we see that this small degree of Putrefaction will suffice for the producing of good distilled Sea-water.

But this distilled Sea-water was much more nauseous than that out of the Hogf-head, so that some of the impurity came over in distilling, which the Water had contracted from the Kilderkin, which had for many Years past had Beer in it, tho' it was washed with hot Water. Thus I have constantly found distilled Water the more nauseous in proportion to the foulness of the Water it was distilled from.

Hence the Empyreumatick taste does not seem to depend on Fire Particles inherent in the Water, but rather from a new disagreeable Combination of the more impure parts of the Water; whereas were it owing to Fire Particles, that adust taste should be more nearly the same, whether the Water were pure or impure,

Nov.

Nov. 28th I put some Isinglass into some sweet *Nore* Water, in order to make it putrify, which it soon did in some degree, and continued to do so more and more till Jan. 29th, when I distilled some of it in that stinking State. It, to my surprise, gave no Clouds with a Solution of Silver, and when sweet, which it soon became, it tasted as well as the good distilled *Mediterranean* Water: Hence we see that notwithstanding the *Mediterranean* Water had stank when distilled, gave white Clouds, and continued to do so for several Months after it was distilled; yet this *Nore* Water tho' distilled in a putrid State proves very good, as it does also when distilled after it is grown sweet again. I cannot guess at any other Reason for the different event of these two putrid Waters, unless it be that the *Mediterranean* Water was in a more highly putrid State, so as to be turbid, whereas the *Nore* Water seemed to be putrid in a less degree, and was pretty clear.

It seems probable that it will be more requisite to have Sea-water putrify and grow sweet again in the warmer Climates, and where it abounds most with Bitumen; because thereby the Bitumen will be rendered less volatile, and be in a great measure precipitated to the bottom of the Casks, before it be put into the Still, whereby what is distilled will be the purer.

VI.

Compte Marfilli says, this Bitumen is in such plenty in the *Mediterranean* Sea-water, particularly on the *Tracian* Sea when calm, and in such abundance on the *East-India* Sea, that it is sometimes seen swimming on the surface of the Water, which he believes to come in a good measure from Coal Mines: Some of it may also come from *Petroleum* which is in many parts of the Earth. He distilled some Mineral Coals, and found that forty Grains of the oily volatile Spirit of Coals put into a Quart of fresh Water, which
was

was made as salt as Sea-water, made it as bitter as the surface-Sea-water : and that fifty Grains of that Spirit, put into a quantity of Artificial Salt-water, made it as bitter as the deep Sea-water.

He says also, that Sea - salt which is made at *Pescais* near the Mouth of the River *Rhone*, is so bitter and disagreeable, that it can't be used the first Year, and scarcely the second ; that it is tolerable the third ; and the fourth Year its Bitter is scarce to be tasted ; and this, whether the Salt be made by Art or the Sun.

That the Taste of the Salt made by the Distillation of the surface Water, is of a biting Saltiness, with an almost intense bitterness ; but that the Taste of the Salt of distilled deep Water is of greater degree of Saltiness, and more disagreeable Bitter.

He says that distilled Sea-water is so disagreeable, that it is impossible to drink it, *viz.* on account of the great quantity of its *Bitumen*, which is more disagreeable than the saline Part ; but this is happily cured by Putrefaction.

If

He found also, that two Pounds of Fountain Water will dissolve half a Dram of Salt more than distilled Sea-water, though their Specifick Gravities are the same ; this he thinks is owing to the Unctuousity of the distilled Sea-water.

He laying the Salt of superficial Sea-water, taken within fix Inches of the Surface, and the Salt of deep Sea-water on blue Paper, the first Salt turned the Paper Red as Nitre will do, but the other Salt had no such affect.

I dipped some Blue Paper in the melted Brine of the Salt, both of the distilled *Mediterranean* and *Nore* Water, and then dryed the Papers, which both gave a reddish cast : But a like Paper dipped in a strong Brine of common Household Salt, had not such a reddish Colour, which shows that the Bittern Salt of Sea-water is partly Nitrous. And since Chymists observe that Nitre consists of an Oily, Saline, and Volatile Substance, no wonder that Nitrous Salt should be formed in the Bittern Salt and Oily Bitumen of Sea-water :

And it is supposed to be owing to the great plenty of this Nitrous Salt, that Sea-water is observed to be more unapt to extinguish Ships on fire, than fresh Water. It was observed that the Papers which were dipped in the Colliquation of the Residue of the Distillations, grew moist much sooner, and in a greater Degree, than the Paper dipped in the Brine of common Salt, *viz.* because of the imperfect bittern Salt which was in them.

This Bittern Salt, of which there is great store in the Sea, is thought to enter much into the Composition of the Nourishment of Plants and Animals.

It is from this probably, that that Universal Salt arises, which as it happens to fall on different Earths, concretes, and corrodes them, and thereby produces different kinds of Salts; the more common whereof, and such as are found Natural, are Vitriol, Alum, Nitre, common Salt and Sal Ammoniac.

And 'tis probable that from the sulphureous Bitumen of the Sea, is raised by the warmth

warmth of the Sun, that subtile Sulphur, with which the Air, and its Waters, *viz.* Dew and Rain are impregnated, which makes them so kindly and congenial for the Nourishment of the Products of the Earth: And when the Air is much impregnated with these sulphureous Vapours, they cause Violent Ferments with pure Air, whence *the Explosions of Lightening,*

VII.

I conclude there will be little or no difficulty in being provided with Sea-water that has putrified and grown sweet again ; since as soon as any Fresh-water Cask is emptied, it may be filled with Sea-water ; which I am told is the constant Practice in many Ships, in order to preserve a due Proportion of Ballast, &c. And when the Cask is close bunged down, this will promote Putrefaction ; as will also the Filth and Sediment of what remained of the fresh Water ; but the Putrefaction may be hastened, by throwing in a few Scraps of any Animal Substance, whether

it be of Fish or other Animals. This I found, that Ifinglass, which is a filthy Substance, soon caused it to putrify. And in warm Climates where the Sea-water abounds most with Bitumen, it will, both on account of the greater quantity of Bitumen, as well as of warmth, be the more disposed to putrify.

When the Sea-water is well putrified, it will be convenient to use means to make it grow sweet, *viz.* by opening the Bung-Holes, as also by throwing in a little clean Sand, which will help to fine down the Water, by precipitating its turbid Filth. But I have not found Sand to hasten the sweetening of stinking Sea-water that was clear; but when turbid and thick, the Sand will then have a good effect in carrying all foulness down with it; as it is well known to do when mixed with slimy Ifinglass in fining of Wines.

As new distilled Sea-water, tho' freed both from Spirit of Salt and Bitumen, has but an indifferent flat adust Taste; this may in some degree be helped, by exposing it

as

as much as the Time will permit to the Air, and pouring it often too and fro, or putting in a few Grains of Salt, or a little Sugar, to give it a Taste. Powder of well burnt Bones will much take off the aduſt Taſte.

Some are of Opinion that diſtilled Water cannot be whoſome, becauſe they ſuſpect that it is thereby deprived of its nourishing Quality. As new diſtilled Water is leſs palatable than the undiſtilled, ſo it may not probably be ſo congenial to our Bodies, on account of that new Texture that is given to ſome of its Parts, to which its diſagreeableneſs ſeems principally to be owing, and not to its being deprived of its nutritive Parts. For when I had ſet by for a conſiderable Time, ſome good diſtilled *Mediterranean* Water, it became very well taſted like other common Water, notwithſtanding it was all that Time in a well corked Bottle, ſo that it could not have any freſh Pabulum or nourishing Quality communicated to it out of the Air, which was excluded by the Cork of
the

the Bottle. And when distilled *Nore* Water, which had a disagreeable Empyreuma, was distilled over again with Salt or Oil of Tartar thrown into it, which detained the heterogeneous Parts of the Water from rising in Distillation, the distilling Water was then free from Empyreuma, notwithstanding it had undergone the Action of Fire now, as much as in the first Distillation. Water is to be looked on chiefly as a Vehicle of Nourishment, and if that Vehicle be deprived of its former noxious Qualities by Distillation, we may then reasonably hope that it may be tolerably good for conveying Nourishment, the being blended with which may also much amend it, tho' it be not so agreeable to the Taste, nor altogether so congenial to our Bodies as other fresh Water.

VIII.

1st. Upon the whole we may observe as far as appears from these Experiments and Observations, that the best Method to procure wholesome Water from the Sea, is first to let it putrify well, and then become

come sweet before it be distilled, by which means the greatest proportion of good Water may be procured from any one Distillation.

2dly. That as appears by stinking *Nore* Water, a smaller degree of Putrefaction, and then turning sweet, will suffice to procure about three fourths of good Water from a Distillation, at least in these Northern Seas, where there is a less quantity of Bitumen : Whether this small degree of Putrefaction will be sufficient in warmer Climates, must be left to Experience to determine.

4thly. That Water kept in a Beer-Cask, gives a much more nauseous Taste when distilled, than from a Water-Cask.

5thly. That when on account of a sudden unforeseen Exigency and Distress there is not time to have Sea-water stink and grow sweet again ; then, if only one third of each Still full of Water be distilled off, but a small quantity of Spirit of Salt will arise : And if they will have the precaution to be provided with two or three
Pounds

Pounds of Salt of Tartar, kept dry in Bottles, a very little of this will change the acid Spirit of Salt in the Water into a more wholesome neutral Salt: But then there will remain the very nauseous Oily Bitumen, the most effectual way to be secured against which, will be, to be well provided with putrid Water if possible.

6thly. It will be requisite also to be provided with a small Vial full of a Solution of Silver in *Aqua Fortis*; A small Bit of Silver, viz. no bigger than a Silver Three-Pence, dissolved in the quantity of a middling spoonfull of *Aqua Fortis*; and sixty Drops of this dropped in an Ounce of distilled fresh Water, will suffice. But the Water must be distilled, else, there being some degree of Salt in most Waters, the Solution of Silver will cause white Clouds in them, which will make them unfit for the Purpose. The purer the Silver the better. I dissolved a Link of a Watch-Chain, which having Copper in it to make it the fitter, the solution was green; yet when ~~some~~ ^{some} of this were dropped on

on an Ounce, or about three spoonfuls of distilled Spring Water, it was clear and did very well for my purpose. I mention this to put those who shall have occasion for it, in an easy way of procuring it, when they have not an opportunity either to get very pure Silver, or to purchase the Solution of Chymists. Two Drops of this Solution dropped into a Glass with half a spoonful of the distilling Water, will presently discover, by the white Cloud it causes, if there be any Spirit of Salt risen with the Water.

7thly. It will be of use also to observe, when a Distillation is over, in what degree of the Distillation the dry Salt begins to incrust on the sides of the Still; as also how far the Distillation may be carried on without danger of raising Spirit of Salt, after this dry Salt first appears; for the *Mediterranean* Sea-water came over good a considerable time after the Salt appeared on the sides of the Retort.

Further Experience and Observations from skilful Persons may hereafter give

more light into this matter, which they will do well to communicate, in order to have them made known for the publick Benefit, towards the promoting of which, I shall be very glad if these Endeavours of mine should prove of any service, which would give me such a Satisfaction, as would afford me an ample Reward for the Labour and Pains I have taken herein, even tho' they had been much greater.

SOME

S O M E
C O N S I D E R A T I O N S
A B O U T

Means to preserve Fresh Water sweet.

LXVII.

AS it is well known by common Experience, that fresh Water preserved in Casks is apt to putrify and stink to such a degree, that the Drinkers are obliged to hold their Noses while they drink it; it may not therefore be improper to add some Considerations on that Subject.

Water when it stands stagnant for some time, especially in close Vessels, is apt to form a thin clammy slimy Substance, to change its colour, taste and smell, and to become very nauseous as it grows more and

more putrid. To prevent this Inconvenience as much as possible, great Care is taken to have the Water Casks very clean. I am informed that if the Casks have had Wine, Beer, or Brandy in them, the Water will stink so as never to become sweet again while in the Casks.

The *Thames* and several other Waters will stink in seven or eight Days, and sometimes sooner, especially in unseasoned Casks, and come sweet again. By opening the Bung-hole Waters often become sweet in twenty - four Hours and sooner when shaken or poured to and fro. The Water would stink more if the Bung-holes were not left partly open; but putrid Water, tho' nauseous, is not observed to be hurtful to human Bodies.

Dr. *Boerhaave*, in his *Chymistry*, Vol. i. p. 598, says that when Rain-water stinks, if it be just boiled, all the living Creatures in it will be killed; and on standing to settle a while, they will subside with other Sediment to the Bottom; then being acidulated with some pure acid Spirit, the
Water

Water is observed to become more wholesome, and that by the same means, *viz.* by adding a little Spirit of Vitriol Water may be preserved from putrifying or breeding Insects, and yet be withal very healthful. But as he has not mentioned what proportion of this acid Spirit should be put in, and as a small Error in excess of the quantity of this very acid Spirit, may render it far from wholesome, even hurtful and noxious; I will here give an Account of what Experiments and Observations I have made on this Subject, in endeavouring to preserve the Virtue of Chalybeate Waters.

I have found that three Drops of Oil of Sulphur in a Wine Quart of Water, have preserved the Water from stinking for many Months, and even two Drops to a Quart of very pure Spring Water, which came from a gravelly Hill, which was all Gravel to its surface, have preserved it sweet for more than six Months. I have observed the Water of such Springs as came from Gravel, to be the purest of any Spring Water,

Water, it being filtrated through the finer Sand of that Gravel, which consisting of innumerable small flinty Stones, give no Tincture to the Water, but purify it as it glides through its fine Meanders. Snow and Hail Waters are the purest of any ; but Rain Water abounding with Sulphur, especially in hot Weather, is apt to putrify. The purer the Water, so much the lesser quantity of acid Spirit will preserve it.

I have from my own Experience, and that of others, known Steell Waters drank with three Drops of Oil of Sulphur to a Wine Quart, not only with much safety, but with great benefit, when drank only in the quantity of a Quart, or Pint, or Pint and half, in a Morning, for a few Weeks, and for a much longer continuance, in the small quantity of half, or a quarter of a Pint.

But I shall not take upon me to recommend the use of this Proportion of Oil of Sulphur, or Spirit of Vitriol, in the much larger quantity of Water which is daily
drank

drank on Ship-board, lest while I am endeavouring to do what Service I can to Seafaring Persons, I should imprudently do them harm. Yet since the Trial may be made with safety in the lesser quantities of Water abovementioned; and since it is well known that Physicians frequently prescribe, to the great benefit of their Patients, twenty four Drops of Elixir of Vitriol, to be drank in a Draught of Spaw Water, or other Liquor, for some Days continuance, in which twenty four Drops there are no less than eight Drops of Oil of Vitriol according to the *London Dispensatory*; which supposing the Draught of Spaw Water to be half a Pint, is above ten times more acid Spirit, than these three Drops to a Quart; there can therefore be no danger in making the Trial first in small quantities of Water, which may from time to time be encreased, as from Experience shall be judged proper. Neither would I propose to have the greatest part of the Ships Water-Casks thus acidulated with Oil of Sulphur or Spirit of Vitriol,

Vitriol, but only some few of them to be made use of where the Ship's Water is extremely nauseous, and till some of it can be made more drinkable by exposing it to the Air. &c.

If any one shall therefore care to make the Trial, and without Trials, few useful Improvements are made; they may take their Estimate from hence, without being at the trouble of counting every Drop they put into a large Cask of Water, *viz.* I found that twenty Drops of Oil of Sulphur, which dropped slowly from a Bottle, weighed twelve Grains; therefore an Ounce Troy, or 480 Grains weight of Drops, will be in Number eight hundred: And there being in a Beer Hogshead seventy two Gallons or 288 Quarts, these at three Drops to a Quart, will take up 864 Drops, that is one Ounce, and sixty four Drops, or thirty eight Grains weight.

And as I have, as above-mentioned, found that a Quart of every pure Water was preserved long sweet, with only two Drops of Oil of Sulphur, it would be adviseable

adviseable to try that lesser quantity too, which may be used with much greater safety, if it will be effectual to prevent the stinking of the Water, which I believe it will do in purer Waters, in a great Measure.

I have frequently observed, that when three Drops of Oil of Sulphur have continued in a Quart of Water for some time, that the little Acidity it gives, has gone quite off, so as not to be tasted, the acid Spirit being then more intimately incorporated with the Water.

That two or three Drops of true Oil of Sulphur to a Quart, will prevent the breeding of Insects in Water, is probable from the following Experiments and Observations, *viz.* July 5th, four Drops of Oil of Sulphur to a *Winchester* Quart and half a Pint of Rain-water, killed the little Insects in it, in twenty-four Hours; a less quantity will therefore probably prevent their growth, in their minute Origin, when they are of a much tenderer Constitution. But as the Insects grew stronger,

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viz.

viz. August 10th, eight Drops of Oil of Sulphur, to a like quantity of Water, did not kill them in three or four Days. But ten Drops killed them in two or three Hours, in the same quantity of Water.

I have chiefly mentioned Oil of Sulphur, because it is looked upon, as somewhat more kindly to Animal Bodies, than Spirit of Vitriol, tho' the difference between them is but little; but as it is more difficult and costly to make Oil of Sulphur by the Bell, than to distill Spirit or Oil of Vitriol, therefore they are, as I am informed, frequently sold the one for the other.

I advise the putting in an Ounce of true Spirit of Vitriol to every forty Gallons of Water, which is at the rate of three Drops to a Quart; true Spirit, because the Spirit of Vitriol usually to be met with, is only Oil of Vitriol mixed with Water, which Oil I would not advise to be used, because it is a more metallick Acid than the Spirit, which is the more Phlegmatick, or lighter Part that comes up first in Distillation: If the Oil is ever used, a third Part
of

of the Weight of it does, that is one Ounce of it for three of Spirit. ----- This Spirit or Oil will be very proper for Seamen in hot Climates, by hindering a too great Perspiration. ---- It is supposed there are not many consumptive Men in a Ship, for whom Mineral or other Acids are not good.

Agreeably to what is observed of the different Degrees of Strength of Spirit and Oil of Vitriol, I have found that one drop of true Oil of Vitriol has preserved a small degree of the tinging Virtue with Galls of the Steel-water near *Claremont* in *Surrey*; whereas none of the tinging Virtues of that Water was preserved with three drops of Spirit of Vitriol. I observed also that the Efficacy, and consequently the Acidity of three drops of true Oil of Sulphur, was nearly equivalent to that of one drop of Oil of Vitriol, it having almost the same effect on *Claremont* Water. So that three drops of this Oil of Sulphur were somewhat stronger than three drops of the Spirit of Vitriol. It is therefore

very requisite to observe the Rule, viz. to put but one third of Oil of Vitriol, since it is comparatively so much stronger. And since Oil of Vitriol is used in making Elixir of Vitriol, which is frequently prescribed with safety; we may thence reasonably infer, that there is little danger in using Oil of Vitriol, provided the above-mentioned Rule be observed.

I am informed, that the *Dutch* in long Voyages, to prevent the Water from stinking, always put into it before they set out, a quantity of Spirit of Vitriol.

In the *History of the Academy of Sciences*, *Ann.* 1722, it is said, that fresh Water has been preserved from putrifying or breeding Insects for six Weeks, by fuming the Cask with burning Brimstone, as is frequently done to preserve Wine and Cyder. And if when a few Gallons of Water are put into the fumed Cask, the Bung be put in, and it be rolled to and fro, this will make the Fumes more effectually incorporate with the Water, as it does by
the

the same means with the Wine and Cyder.

P. S. Before I quit this Business, I would say somewhat concerning a Phænomenon that has puzzled some, *viz.* that of the Water's taking Flame sometimes on opening the Casks near a Candle; which must proceed from this, *viz.* that those Casks had had in them Beer before the Water was put in, and which not being washed, there remained the grounds or Sediment of it, which fermenting, produced the Vinous Spirit that took Flame, as before-said; for Water considered as Water could never do it.

DIRECTIONS

TO PRESERVE

Ship-Biscuit and Corn from being eaten by
Weevels, Meggots, or Worms.

LXVIII.

THERE is another great Inconvenience to which Seafaring Persons are frequently exposed, by having their Provisions of Biscuit and Corn much spoiled by being eaten by Worms, Meggots, or Weevels, especially in long Voyages; which Inconvenience might probably be in a great measure prevented by the following Means, *viz.*

It is well known that the Fumes of burning Brimstone are most destructive of animal Life; and will therefore not only destroy living Animals, but will also prevent the growth of them in Bread or Corn, which is packed up in close Vessels, in
which

which the Air is strongly impregnated with these Fumes ; which it is well known by repeated Experience, have a Power of destroying, or reducing to a fixt unaerial State, the more wholesome part of the Air.

Having therefore filled the Cask with Bread or Corn, or any other vegetable Substance which is liable to be worm-eaten ; bore six or eight Holes in one Head of the Cask, and two Holes in the other Head, more or less, as Experience shall prove to be best, all of them about the size of common Quart Corks.

And that the Corn may not drop thro' these Holes, nor the Bread stop them up, it will be convenient to nail within side of each of these Casks, three or four Sticks about an Inch thick, these Sticks having a piece of Hair-cloth, or very coarse Sack-cloth laid on them, will prevent the falling thro' of the Corn, and yet give room for the Fumes of the burning Brimstone to ascend ; and the Sticks without a Hair-cloth,

cloth, will prevent the Biscuit from immediately covering the Holes.

Having therefore provided a sufficient quantity of pieces of Tow or Linnen Rags dipped in melted Brimstone; if the Casks are to be fumed, then having dug a hole in the Ground about a Yard deep, and eighteen Inches wide; throw into the Hole more or less, as Experience shall shew best, about a quarter of a Pound of the Brimstoned Tow or Rags set on Fire, immediately placing over the Hole the Cask, with that end which hath most Holes in it undermost, for the Fumes to ascend thro' them into the Cask, which yet they would not do if there were not some Holes in the upper Head of the Cask, to give vent for the Air to ascend thro'.

When you guess the Brimstone is burnt out, and that the Cask is full of Fumes all over; which it will be, when they have ascended for some time thro' the upper Holes, then drive Corks into the upper Holes, and turning the Cask side-ways on its Bung, immediately cork up the lower

H h

Holes.

Holes. The tighter the Cask is, the better, and the longer it will keep the Fumes in, and prevent the entrance of fresh Air, which would promote the breeding of Insects.

But if by reason of the too great closeness of the Hole in the Earth, it shall by Experience be found, that the great smother of the Fume extinguishes the burning Brimstone; then a less deep Hole may be made use of, on which a Cask may be set with both its Heads out; the Bread or Corn Cask being set on this, at such a Height from the burning Brimstone, as to prevent the Bread or Corn being scorched by it; for which purpose about a Yard will be high enough: If need require, there may be two or three Holes boarded in the sides of the headless Under Cask, or some space left at the bottom in the Earth, to give vent enough to keep the Brimstone burning.

'Tis probable that by this Means, Biscuit, Corn, &c. may be long preserved
from

from being Worm-eaten. But in case it shall by Experience be found needful to renew this Fumigation, especially in some long Voyages; it may be done with great safety on Ship-board in calm Weather, *viz.* by placing a Cask on Deck with its upper Head out; in the bottom of which let there be near a Foot depth of Ballast, pressed hard down, with a kind of hollow Baffin in its middle, wherein to lay the burning Brimstone.

Not only Bread and Corn Casks may be thus fumed again if need require: But also the Bread in the Bread-Room, if infected with Weevels or Worms, may by being thus fumed in Casks, have all the Vermin destroyed, which will conduce much to the preserving of the Bread by lessening their number, tho' they cannot thus be wholly extirpated; because the Bread-Room itself cannot be fumed at Sea, while the Ship is full of People, tho' it may safely be done when in Harbour; by burning then some Brimstone in it, on a

thick Bed of Ballast, in a shallow open Tub, which would for a long time preserve the Room from being infected with this Vermin.

I am told, that it is by some such Means, that all the Rats in Ships are destroyed when in Harbour. But I must again, and again, caution against using any Fumes of burning Brimstone under Deck while any Persons are there; for they will instantly be suffocated before they are aware of it.

When the Weevels are got into the Malt or Corn in a Grainery, they might easily be destroyed, by putting the Weevelly Corn into Casks or Chests, or large Cases made of Boards, which being placed over Holes in the Ground, with burning Brimstone in them, would soon destroy all living Animals in the Corn, and a great deal of Corn may be thus cured of Weevels, &c. in a little time.

The Weevels in a Grainery full of Corn, may also be destroyed in the following manner, *viz.* Let there be many Holes
boarded

boarded in the Boards of the Grainery of such a size that the Corn cannot fall thro', or else let there be in several parts of the Floor, large Holes covered with Laths, on which Hair-cloaths are to be laid, as in Malt-Kilns. And having provided a large quantity of Tow dipped in melted Brimstone; if the Ground-Floor of the Grainery be of Earth, lay several heaps of this brimstoned Tow, as big as a Man's Head, in the proportion of about four heaps to every twelve Feet square; taking care not to place them near the Walls. But if the lower Floor be covered with Boards, then lay the Parcels of Brimstone on heaps of Sand or Earth, eight or twelve Inches thick, and laid on Tiles or Bricks, and hard prest down, to prevent the melted Brimstone's getting thro' it: And for greater security, I used to put the Earth into common Wash-Tubs. If the Floor on which the Corn lays, be six Feet distant above the burning Brimstone, there will be no danger of its catching Fire:

Yet

Yet for fear of Mischief, great Care must be taken. All Doors and Windows must be closed as much as possible. If there are several Graineries over one another, the Fumes will pass thro' all with great Velocity and Acrimony.

The Fumes of burning Brimstone placed thus under the Corn, will ascend through it with great velocity and acrimony: But if the burning Brimstone is placed above the Corn, tho' confined in a close place, the Fumes will not then descend into the Corn, as I have found by Experience, having put in a Muslin Rag of Ants at the bottom of such fumed Corn; but they were not killed thereby.

I have fumed whole Malt thus very strongly, and then being ground, brewed with it; it gave no Taste to Beer that I could perceive. The probable effect of fuming it will be, that it may prevent the Beer's working too fast: for this is well known to be the effect of such Fumes on Wine and Cyder.

I fume-

I fumed thus also some Sea-Biscuit, Pease and Wheat in a large Glass Vessel, which was repeated again after ten Days ; yet they had no ill Taste, and exposing them for some time to the open Air, would probably free them from the very little Taste it gives. I sowed the Pease, which grew, so that the vegetative quality of them was not spoiled ; but the vegetative quality of the Wheat was thereby wholly destroyed, for none of it grew, tho' sown three several Times at some Weeks distance. It will not therefore be adviseable to fume Corn thus, which is intended to be sown. Tho' it will probably prove an effectual means to preserve Corn that is to be eaten, which will be of great use, especially in hot Climates, where I am informed that the Corn is in great quantities spoiled by this Vermin.

When the *Weevil*, &c. have got into a Cask of Bread or Corn, there is no doubt but that thus fuming will destroy them ; but it is doubtful whether their Eggs will
thereby

thereby be spoiled: If therefore on experience it shall be found that young ones are hatched from those fumed Eggs in some little time; then if these last hatched *Wee-vels* are destroyed by another Fumigation, before they live long enough to lay Eggs; this will be a Means to prevent their increase for a long Time: But I think it probable, that if the fumed Casks are so close as to admit no fresh Air, that the Eggs will scarcely hatch; or if they do, that the very tender young ones cannot live and thrive in such an Air.

Since the vegetative quality of Wheat is destroyed by the Fumes of burning Brimstone, a Hint may hence be taken for an improvement in making of Malt, *viz.* By thus destroying the vegetive Power of Barley, which may probably be done, by laying it on the Kilns, and burning a good quantity of Brimstone under it for half an Hour or an Hour; the Fumes of which will ascend thro' it, tho' laid to any degree of thickness. And if they shall

shall be found to have the same effect on Barley as on the Wheat, then the Root of the Barley will not shoot ; and consequently so much less of the Substance of the Grain will be exhausted in Malting, on which account the Malt will be proportionably better. This may first be tried by fuming only a handfull of Barley well, and then seeing if it will grow when sown in the Earth, or put in Water. Great care must be taken not to come near the upper part of the Kiln while the Brimstone is burning, lest they should be instantly suffocated.

DIRECTIONS
FOR
Salting ANIMALS whole,
IN ORDER
To make the Flesh keep Sweet in hot
CLIMATES.

LXIX.

AS the Difficulties and Hardships which Seafaring People labour under are many and great, not only on account of their being reduced to the great straits of a very short and scanty Allowance of wholesome fresh Water, and sometimes perishing for want of some to drink : So are they also oftentimes put to great Difficulties and Hardships for want

of wholesome Provisions to eat, especially in long Voyages and in hot Climates, which often occasions the spoiling of their salted Flesh, by the evaporating away of the Pickle, whereby it either becomes putrid and stinks, or is exceeding hard and dry, with little or no nourishing Virtue in it, causing thereby dangerous Scurveys. I hope therefore the following Directions for making Flesh take Salt very well in the hottest Climates will be of great service, by showing them how to provide themselves with it there when they have occasion, either thro' the badness or want of such Provision.

I have met with several who not understanding Anatomy, have looked on the Operation, as too difficult to be brought into common use; but on the contrary it will be found on Trial most easy to do. I have by once showing, directed a common Butcher how to do it; and the Surgeons on Shipboard can soon instruct any one how it is to be done. And Necessity, which is said to be the Mother of Invention

tion itself, will soon, doubtless make Men expert in performing a thing already invented ; and I am informed that it has already been put in practice in a hot Climate with Success.

A sufficient quantity of Brine or Pickle must be made with common Salt, in the proportion of two Pounds and an half of Salt to a Gallon of Water, which when boiled and scummed, will be nearly in the proportion of two Pounds of Salt to a Gallon of Water, and which is the most that that quantity of Water can dissolve ; so that if there were more Salt in the Water, there might be danger of its not entering in an undissolved state into the 'fine Blood-Vessels.

The quantity of Salt, in half a Pound of *Mediterranean* Sea-water being 128 Grains, *i. e.* $\frac{1}{273}$ of the whole, and a Gallon of Water weighing ten Pounds and three Ounces, there is in a Gallon of Sea-water, five Ounces, three Drains, and twenty-eight Grains of Salt, which is about the ninth part of the Salt, which a
Gallon

Gallon of Water can dissolve. Hence we see, to how great a degree a very salt piece of Beef, may be freshened, by being laid to soak in Sea-water.

In order to salt an Ox whole, it will be convenient to provide forty or fifty Gallons of Brine or Pickle; for what is not injected into the Arteries, will serve to put the pieces of Flesh in, being first made stronger than with only three Pounds of Salt to a Gallon, as is done at the *Victualling-Office*.

For a Hog, Sheep, or Deer, provide five or six Gallons of Pickle, and when you intend to use it, let it be made pretty warm, and have some cold by you to bring it at once to a due Temper, *viz.* something more than blood-warm. If it were cold, by contracting the Blood-Vessels, it would probably pass with more difficulty; and for the same Reason it is adviseable to infuse the Brine as soon as the Animal is dead, lest when cold and stiff, it should not be able to penetrate thro' the rigid and contracted Vessels.

Let

Let the Animal bleed to death by cutting the Jugular Veins, whereby more Blood will be evacuated than in the common way of knocking them on the Head, and then cutting their Throats, and the Flesh having by this means less Blood in it, it will the better keep on being salted. If you happen to cut a large Artery, tye it up, by drawing a Packthread round it with a crooked Needle, else much of the Pickle will be wasted thro' it. If the Creature has done bleeding before it be quite dead, as will sometimes happen, then hasten its death by a blow on the Head.

Then laying the Animal on its Back, a little inclining to its right side, open its Belly, and turning the Caul and Bowels on the left side, find the great Artery where it lies close to the left side of the Back-bone, at the small of the Back below the Kidneys; and having cleared the Artery of the Fat and thin loose Skin that covers it, cut it half asunder a-cross, and then slit it with a Pair of Scissors length-ways, a little more than the length of the short end of the
 Brass

Brass Cock *E. D.* [*Fig. 1.*]; then thrust into the Artery towards the Heart, the longest end of the Cock *B. E.* so far, that the shorter end of *E. D.* may enter the other part of the Artery; then having with a crooked Needle, passed pieces of Packthreads under the Artery between *B. E.* and *E. D.* tie the Artery fast to the end of the Cock *B. D.* If in an Ox the Share-bone be opened carefully with a Cleaver, just over the Bladder, it will be easier to come at the Artery, the Belly being thereby opened the wider.

For an Ox, the Diameter of the Brass Pipe *B. D.* may be near half an Inch; and the length of the end *B. E.* four Inches, of *E. D.* two Inches; for if both ends were of an equal length, it would be difficult to fasten each end of the Artery, because the slit of the Artery must be so much the longer to give room for *E. D.* to enter it.

For Sheep, Hogs, or Deer, the Diameter of the bore of the Brass Pipe *E. D.* may be almost two tenths of an Inch; the

the longest end *B. E.* two Inches and a Quarter, and the shortest end *E. D.* one Inch and half, each end running taper, thereby the better to enter the Arteries, with a swelling and nitch at *r. r.* as in the Figure here referred to, thereby to prevent the tied Arteries from slipping off at either end.

Then having a Linnen Rag twisted and tied round the upright end of the Cock *A.* thrust it fast into the end of a Spanish Reed or hollow Cane, tying it fast; the Cane to be eight or ten Feet high for an Ox, and five or six Feet for a Hog, Sheep, or Deer, these heights being nearly equal to the height to which the Blood is raised in these respective Animals by the force of the Heart.

I have therefore chose herein to imitate Nature, by making use of a Force nearly equal to that with which the Blood is by Contraction of the Heart, drove thro' all the Blood Vessels of the Body; but perhaps a much less force may do, which

those who have Opportunity will do well to try.

When I reflect on the great Number of Experiments of this kind, which I had made several Years before on Animals, it seems very natural thence to have fallen on this Method of salting Animals whole; yet I did not think of it till several Years after; when upon a Seafaring Man's telling me of the very bad stinking Flesh they were sometimes obliged to eat at Sea, it presently occurred to my Thoughts, that Flesh might be made to take Salt in hot Climates, by thus infusing Salt-pickle thro' their whole Substance.

Care must be taken in tying the Cane above to some proper support, that hang so true as not to distort the Artery, by too much raising or depressing either end of the Brass Cock *B.* or *D.* whereby the small branching Arteries, which go from the great one to each Rib, may be overstrained or broken, which would disorder the Experiment and cause a great waste of the Brine thro' the broken Arteries.

The

The long Reed or Cane being thus fixed to a proper support, with a Tunnel in the top; first stopping the Cock, fill the Tunnel and Cane with Blood-warm Brine, then open the Cock, and the Brine will flow freely thro' the whole Substance of the whole Animal; the Tunnel must be kept constantly filled as the Brine subsides. And if by any Accident the Tunnel and Cane are empty, then stop the Cock again, till they are refilled, otherwise Air will be drove in the Arteries with the Brine, which will hinder the entrance of the Brine into the finer Vessels; by this means you will find the Brine flow and insinuate itself into every part of the Animal's Body in the same manner as the Blood does, it being conveyed by the same Vessels; and this you will soon be convinced of, by making a small cut in any of the extremities of the Body, as the Nose, Tail, Ears, or Feet; at any of which places the salt Brine may be tasted.

I have observed that during the Operation the Brine flows to waste too freely,

thro' the Windpipe, and cut Jugular Veins of Sheep, and probably it may be the same in Deer, tho' it does not flow there so fast in Oxen or Hogs. But this may be prevented by putting a Cork into the Windpipe, and by tying a Cord hard round the Neck to stop the Veins.

I have let the Brine flow thus into the Arteries of an Ox for half an hour, and into Hogs and Sheep for a quarter of an Hour, which is doubtless a due time, when the Flesh is intended to be thoroughly salted afterwards; and probably Experience may show that a much less time will suffice; for if once the Flesh be thoroughly soaked with Brine, it will doubtless imbibe dry Salt fast enough to preserve its inmost parts from putrifying, even in the hottest Climates; for Flesh thus prepared is observed to imbibe Salt much faster than other Flesh.

But I believe the flowing in of the Brine for a much shorter time, may be sufficient to make Flesh keep a few Days for the use of a Family at Land, or for a Ship during

during the first part of its Voyage, putting it into a strong Pickle; but if it be to be kept many Days, it must be rubbed first with dry Salt and layed to drain a few Days, as is done at the Victualling-Office, where they cure the Flesh in the following manner, *viz.* they first rub it with the white Salt only; then put it into Brine for five Days to drain the bloody part out, for 'tis the Blood that is most apt to putrify: Then they pack it into Casks, strewing white and bay Salt between each laying; then fill the Cask up with Pickle made of Water and Salt, boiled so strong as to bear an Egg: They put three Pounds of Salt to a Gallon of Water. The proportion of Salt, Pickle included, is, to an hundred weight of Flesh, four Gallons and an half of white, and one and a quarter of bay Salt.

The pieces thus salted with dry Salt, after the infusion of the Brine or Pickle, must be laid to soak for some time in Water before they be used, else they will be apt to be too salt. The dry Salt, as before

fore observed, soaking very fast into the thus brined Flesh ; so that there is not the least danger of its not keeping sweet ; there seeming rather to be more danger of its being by this means too salt, which may doubtless by further Experience, be better regulated and proportioned to the longer or shorter time it is intended to keep it.

I will here give an Account of the event of some Trials which I made ; having salted whole in this manner, four Hogs, three Sheep, and two Oxen.

I find that Flesh salted in this manner requires much boiling, it being very moist and full of Gravy, tho' well tasted. It is too salt to broil or roast with only the infusion of Brine.

I have found a piece of it which had only the Brine injected thro' the Arteries, keep sweet ten Days, tho' hung up in the Chimney Corner, yet sometimes it would not keep so long. An argument that it may probably be good in hot Climates for
a few

a few Days, without the addition of dry Salt, especially if put into strong Brine.

When salted well with dry Salt, which the Flesh imbibes most freely, it will keep long, even tho' heated much with hunting just before it is killed; as I found by the Flesh of a Sheep, which was purposely hunted by a muzzled Dog for twenty-five Minutes. From whence we may reasonably conclude, that Flesh thus salted, will take Salt, and be preserved good, even in the hottest Climates.

Beef and Mutton thus salted, eat very well, as also Pork.

The Ox which was thus salted the 17th of *April* 1736, at the Victualling-Office on *Tower-Hill*, before several of the Lords of the Admiralty and Commissioners of the Victualling-Office; having its Jugular Veins cut asunder, there flowed out eighteen Quarts and a Pint of Blood, *Winchester* measure, in forty-one Minutes, which Blood weighed forty-six Pounds and a Quarter.

After

After the Brine had flowed freely for some time, with the force of a Column of Brine eleven Feet high some of it came frothy thro' the Windpipe, from the Lungs, but what came from the Nostrils was clear.

The Brine flowing in thus, freely, for about half an Hour, the Body of the Ox was greatly swelled all over. There was about forty Gallons of Brine used, much of which was wasted, tho' a great deal of it had soaked into the Flesh and Fat, the Quantity of which would have been greatly increased, in proportion as the Operation had continued longer. Some of the Brine ouzed into the Stomach and Bowels.

The Ox by estimation of experienced Butchers, who are well known to guess pretty nearly to the Truth, weighed five hundred and a half, but with the Brine in it, it was found to weigh eight hundred one quarter and eighteen Pounds; so that it increased in weight, on account of the Brine, two hundred three quarters and eighteen Pounds.

The

The Carcass had not wasted above two Quarts, in hanging two whole Nights; but in cutting into small four-Pound pieces, it wasted fifty-two Pounds more by draining off of the Brine.

I procured from the Victualling-Office an Account of the event of this Experiment on the Ox, *viz.* Two Casks of this Flesh, which was not salted with dry Salt, soon stank to a very great degree; as also I found in several Instances, that Flesh thus salted with Pickle only, would not keep many Days without being also further salted with dry Salt.

The Flesh of two other Casks of the same Ox, which was salted with dry Salt before it was packed in the Cask, being examined eighteen Months after, and a Piece of it being boiled, it was judged not fit for Men to eat, as its Juices were entirely eat up by the Salt, and it fell in pieces like rotten Wood.

Whence we see that it was over-salted. It will therefore require farther Experience to adjust the Degree of salting for the use

of Ships in hot Climates. I kept some of the Mutton of the Sheep that was hunted, and thus salted full six Months, which proved good and was not too salt, when layed first to freshen a due time in Water.

It has been suspected, that salting the Flesh thus, while hot, may be some disadvantage to it, as to long keeping. It may therefore be well to try whether Flesh can be thus salted when cold; but 'tis to be feared, that in hot Climates, where only this Method is like to be of Use, Flesh will stink before it is cold.

If any in hot Climates shall desire only to salt one half of an Animal, it may easily be done, by stopping one end of the Brass Cock, and fixing only the other end of it into the Artery, so as to have Brine flow only through the Artery that leads either to the fore or hinder half; by which means part may be eat fresh, and the salted part the following Days.

If any should desire to keep a part of hunted Venison a few Days, or to send unhunted Venison to a great distance in hot Weather,

Weather, it might probably be done, by only thus injecting into the Arteries a little Brine, which might not disqualify it for Pasties or Boiling.

I have been told, that in order to preserve Flesh in the hot Parts of *America*, they dip thin Cutlets of it in Sea-water, and lay it on Rocks to dry, which makes it look like Glew-Cakes, and is called *Jerked Flesh*.



A
P R O P O S A L
F O R
Cleanſing away Mud, &c.
Where Waters have a Stream or Current.

LXX.

IT is well known that foul muddy Waters carry along with them a conſiderable quantity of Mud, &c. which they are apt to depoſite in great quantities, eſpecially in Places, where, by reaſon of the frequent return of Tides, it has more time to depoſite its Sediment, by reaſon of its ſometime ſtagnant, ſometimes flow and contrary motion; as in the Mouths of Rivers that are not rapid, in Harbours and Reſerviors, which are filled by the Tides.
Now,

Now, if Water can by any means be made considerably more muddy in flowing out of, than into such places, those places must consequently be gradually cleansed of some of their Mud, in proportion to the greater degree of muddiness of the Waters when they flow out, than when they flow in.

And this I think may be effected in a good measure by the following Means, *viz.* by keeping the Mud well stirred, while the Stream is flowing out of the place, by means of large Rakes, linked at the ends of each other, and drawn by Horses; which Rakes must have one, two, or three rows of Teeth, nearer or further off from each other, according to the different degree of stiffness or softness of the Mud. And if these Teeth stand as high out on the upper as on the lower Side of the Rakes; then when the Horses turn to go back along with the same Stream, the Rakes being thereby turned over, the Teeth which were uppermost, being

being then become the lowest, will take place and stir up the Mud.

And these Rakes may be drawn, either farther from or nearer to the Shores, as shall be required, by various means, *viz.* By the Horses on either side going for some space, before or behind the others, or when the Horses can only go on one side, by having them fixed to different Ropes of different lengths, as Occasion shall require. And sometimes by fixing, either before or behind, as Occasion shall require, broad Pieces of Wood edgewise, which by running obliquely into the Mud, might turn the Rakes, in the same manner as Rudders do Ships; whereby their progressive Motions would be, not according to the direction of the drawing Rope, but in the desired Course.

By these and the like means, great quantities of Mud might be stirred up, and carried off by the Water, and that without any great Expence, considering the Advantage it might in many Cases be of, in cleansing off of Mud.

Tryals

Tryals might at least be made, in some of the more commodious Places for the purpose; whence a better Judgment might be made as to the probability of success. Neither should we be discouraged, if Matters do not at first answer our Expectation: It is from repeated Trials and Observations, that we are to hope to make successful Improvements in new Attempts, which are often baffled and laughed out of Countenance by incompetent Judges; who fancy they show their deep Judgment and Penetration, in slighting and rejecting Attempts, which at first may prove unsuccessful; but which an unwearied Diligence and Perseverance might make effectual, to the great Benefit and Advantage of Mankind.

There would be no great Expence in making a few Tryals of this sort, in commodious Places for the purpose; which I am perswaded would be found to carry off such Quantities of Mud, as would encourage the farther Prosecution of it.

And

And we have good Encouragement to make some Attempts in this way, from the success that the Inhabitants of *Damascus* find in cleansing their many muddy Rivulets, *viz.* by putting a great Bough of a Tree into the Water, and fastening to it a Yoke of Oxen; upon the Bough there sits a good weighty Fellow, to press it down to the bottom, and to drive the Oxen: In this manner the Bough is dragged all along the Channels, which are thereby cleansed. See Mr. *Maundrell's* Journey from *Aleppo* to *Jerusalem*. Now a well contrived Rake would not only require less force to draw it than large Boughs of Trees, but would also more effectually raise and stir up the Mud than Boughs could do. And possibly there may be some Cases, in which it might be of service, to have either very long or broad Harrow-like Rakes, moved briskly to and fro, by the large Cranks of Water-wheels fixed in steddily - anchored or moored Barges, or elsewhere as Occasion may require.

M m

I have

I have here only given a general Hint which may possibly be farther improved by some of the many ingenious Masters in Mechanics, with which this Age abounds.

LXXI.

Other Miscellaneous Subjects.

It has been found upon Tryal that the Sea in some Places is two Miles deep, and perhaps may be more, which cannot well be known, because Currents drive the Weight and Ropes away, and hinder their descent. The Salt in it must be from Hills of that Matter, which is not so in Rivers, because not deep enough to come at it.

LXXII.

THE Cure against the bite of the Viper was kept a Secret a long time, which at last was known to be done by an Oil made from the Fat of the intestines of the Viper. Not long since there came a Man and Woman to *Windsor*, who offered the Physicians and Apothecaries of that Place, to shew them a new cure against the bite of the Viper; and for that Purpose a Day was appointed at the Town-Hall, where
many

many Gentlemen being gathered together, the said Man and Woman desired a Chafing Dish of Charcoal to be brought ; then the Man irritated a very vived Viper, which bit him upon the Knuckle of the Thumb, and upon this the Woman held his Hand over the Charcoal and anointed it. After that he caused another Viper to bite him on the Arm, which place she also anointed, when no harm ensued. After this the Woman was bit in her turn, whom the Man anointed, and she received no harm. A Purse then was collected for declaring the Secret, which was no more than sweet Sallit Oil.

LXXIII.

S I N C E the above I have talked with an ingenious Surgeon from the *West-Indies*, who informed me, that the same Oil has been tried against the bite of the Rattle-Snake, and found effectual. It were to be wish'd that the same Remedy were tried against the bite of a Mad-Dog, which is a deplorable Case, and against which we know no sure Cure.

LXXIV.

A Dog being bit on the Shoulder by a Rattle-Snake, and rubbed with Oil, and Oil given him, he only swelled. If not thought foreign to the purpose, I would add here another Observation, *viz.* A Surgeon and some others being gathered together to open a Dog, to see the motion of the Heart, the said Dog bit one of the Persons present, who died raving mad, notwithstanding the Dog was no way so before the cutting.

LXXV.

THE following was related to me by the Secretary to the Royal Society, at London, *viz.* A Lady was turning out some old Things in a Box, among which was a dried Head of a Rattle-Snake, with the Tooth of which she pricked her Finger, and died by the Poison received from it.

LXXVI.

IT is well known that the common Snakes have no Poison or harm in them,
and

and that what he puts out of his Mouth that People think to be a Sting, is his Tongue, some of which are kept in Glasses in the College in *Dublin* : Such a Snake was kept by a Man in the North of *England* to show in Ale-houses for what he could pick up of People, which he put on the Table to be the better seen : When the Snake would try to creep off the Table, and the Man would as often toss him on again with his Hand, till the Snake growing angry, bit him, and which bite was attended with the usual deadly Symptoms of the Viper. It is also a Quere, whether if almost any enraged Animal should bite a Man, it would not have some such Consequence, or a Man enraged should bite a Man?

LXXVII.

COMMISSIONER Ross in the King's Service at *Edinburgh*, related the following, *viz.* That when he was in the *West-Indies*, he walked out one Day where there were some Mulberry Trees,
upon

upon one of which he saw a Rattle-Snake, when he struck gently at it with his Cane, on which the Creature struck at the Cane to bite it, and instead of it bit the Tree : After which he walked several times that Way, and saw the Tree began to die, the Blossoms to fall off, and the Leaves wither ; which if so is an odd Event. This same Gentleman, (who was accounted a Man of Veracity) said that he saw a black Snake and a Rattle-Snake near one another, when the last struck at the first to bite him, and instead of that, bit himself near the Tail, and died by his own Poison.

LXXVIII.

Observation on Soaps, viz.

THAT which is the whitest is from Turkey, it is made of Poppy-Oil, Lime, and Salt, which is to be rejected in Medicine. The *Marseilles* and *Alicant* are the best Soaps ; but a better, and not nauseous will be made thus, viz. Salalcali three Drams, sweet Oil an Ounce and half, and forty five Grains.

LXXIX.

LXXIX.

I T sometimes happens that the Ink used in Writings of Consequence will be lost or obliterated, which may be of very ill Consequence; but this Writing may be made plain and legible thus, Take Auripigmentum half an Ounce, quick Lime an Ounce, mix them, upon this pour six Ounces of soft Water, digest in a Bolthead upon warm Sand six or eight Hours, during which never put your Nose to the Mouth of the Vessel, let it cool, pass the Liquor through a Rag, and dip the Feather-part of a Pen therein, which strike over the Writing you would restore, and you may plainly read it.

LXXX.

I F a Person be about to ride any where in Winter, and suspects it will Rain, he may know by the following Observation eight Hours before the Rain comes, and so resolve to take a Great Coat with him, or otherwise escape it, viz.
Let

Let him observe the top of the Mercury in the tube of the Barometer, and if Rain be about to come, it will be indented or concave, otherwise, convex or protuberant.

LXXXI.

Making a good White Wine.

T A K E three hundred Pounds weight of *Malago* Raisons, cut them like minced Meat, pour on them sixty-two Gallons of Water near boiling, set it to ferment in a Vessel for a Fortnight, stirring it every Day, when the fermentation is over, press it from the Raisons, and put the Liquor into Casks and cork them, reserving a dozen Bottles of it to fill into the above Casks as their Liquor sinks, let it stand so for four Months, then to every four Gallons of it put a Quart of soft Brandy, having first drawn it off into other clean Casks, then press the Sediment through a fine Flannel Jelly-bag, and join it to the other, so let it stand two Months with the Brandy, and it is done.

T H E
M E T H O D
O F

Making P H O S P H O R U S.

LXXXII.

E V A P O R A T E five or six Hogf-heads of Urine (that has fermented five or six Days) until it becomes black and hard like Soot. Five Hogf-heads of Urine gave thirty eight Pounds of this Matter hard and brittle.

Eighteen or twenty Pounds of this Powder is enough for two Operations, with a Receiver containing seven Gallons.

Take four or five Pounds of this Powder, put it in an Iron Pot in the open Air, over a Coal Fire, until the bottom of the Pot is red hot, stirring it continually till the fixed Oil and volatile Salts be almost dis-

N n

sipated,

fipated, and the Powders cease to smoke; it will then acquire the smell of Peach Flowers. Repeat the same Operation with four or five other Pounds till the twenty are calcined.

Take six or seven Pounds of this calcined Powder, pour on seven or eight Pints of Water, stir it well, and let it soke for twenty four Hours; then pour off the Salt-water by Inclination; dry and Powder well what remains.

The preceding Calcination had carried off one third Part of the weight of the Sediment; the washing carries one half of the remaining two Thirds. Three Pounds or a little more of the remaining Matter, is sufficient for one Operation in the Receiver above, and produces nine Drams of Phosphorus.

With these three Pounds of Matter calcined, washed and dried, mix one Pound and half of coarse Sand or Freestone pounded, the finest part being sifted from it and thrown away as useless. River-Sand will not do, because it sparkles when
it

it feels a great Heat. To these four Pounds and an half of mixture, add four or five Ounces of pounded Charcoal made of Beech Wood, or any other except Oak, because it sparkles also in the Fire : Moisten the whole with half a Pound of Water, mix it well and make it up into Balls, and put them into the Retort so as not to dirt the Neck of it.

Before you put the Retort into the Furnace, it will be expedient to make the following Essay, to know whether you you may hope to succeed.

Put one Ounce of this mixture into a Crucible, and heat it till it is red hot : After it hath smoaked, it must split without swelling, even without rising in the Crucible. Then will arise with rapidity undulations of white and blueish Flames. In those is all the danger of the Operation, When those Flames are over, you must increase the Fire by putting lighted Coals on the top of the Crucible.

Then will a luminous quiet vapour appear, covering all the surface of the Mat-

ter, of a Violetish colour: This is the second Phosphorus. This vapour lasts very long, and has a strong smell of Garlick, which is the criterium of *Cunckel's* Phosphorus. Other Phosphoruses in Powder have a smell of Brimstone, or of Hæpar Sulphuris.

When all this luminous vapour is dissipated, pour it on a Plate of Iron. If you find no Salts in fusion, and that all the Matter is reduced to Powder, it shews that the Matter has been sufficiently washed, and that it contains no more fixed or marine Salts than is necessary; otherwise the Operation is likely to miscarry, because the Retort will be eaten through with the Salts; therefore you must wash it and dry it again.

If the Matter swells and puffs up in the Crucible, you will have no Phosphorus: As it happened to us when we made use of Urine from the Dyers, which had Allum infused in it.

No Retort, we know, will bear the great Fire necessary in this process, except those

those from *Hesse-Cassel*. The Furnaces must be such as in a small space will give a heat at least equal to that of the Glass-House.

To a Retort of *Hesse-Cassel* adapt a large receiver, one third part of which must be filled with Water : They must be luted together with a Paste made of crude pipe-clay, and the greasely Oil used by Painters ; this must be covered with common luting, diluted with a decoction of strong Glue. Stop all the upper holes of the Furnace, and let the luting dry for two or three Days. If the luting should crack in drying, you must then pass it over with a Painter's brush dipped in common luting thined with Glue : for there must not be the least crack or vent left for the Air in this place ; for the Phosphorus would then take Fire, and be lost. However, a Hole is absolutely necessary ; for without it there is no possibility of succeeding. And in this lyes the secret of the Operation, yet no Chymist has ever spoken of it in the process of the Phosphorus.

This

This Hole must be situated so, that the Phosphorus may be obliged to circulate on the Surface of the Water, before it can reach it.

The Hole must be likewise four or five Inches only above the Surface of the Water, and one twelfth Part of an Inch in Diameter. It must be stopped with a Bit of Beech, with a Knot at one End, that it may not fall into the Receiver, and go easily into the Hole.

This Stopper must be taken out frequently, and the Hand must be held before the Hole to feel if the Air rushes out too violently. If it does, you must stop the Ash-hole to abate the Force of the Fire; if it does not come out with Force enough, quicken the Fire by adding more Coals, and shutting the Door. In a Word, if the Fire is well ordered, the Operation will not fail; but it is by the little Hole only, that you may assuredly know how to do it.

The Process of the Phosphorus generally lasteth twenty four Hours. We commonly

ly begun it at two o'Clock in the Morning by putting black Coals in the Ash-hole, and a little lighted Coals at the Door of it, to heat the Retort very slowly. When they are well lighted, push them in the Ash-hole, and shut the Door with a Tile: This moderate Heat dryeth the luting, and distils a Flegm from the Mixture.

At six o'Clock, we put the Coals on the Bars, and the Fire in the Ash-hole lights it little by little. With this Fire brought nearer to the Retort, the Receiver is heated, and fills itself with white Vapours that have the smell of Foetid Oil.

At ten o'Clock, the Receiver clears and cools. Then you must open the Ash-hole about three Inches, and put fresh Coals on the Bars of the Fire Place every three Minutes; taking Care to shut the Door, lest the cold Air rushing in should break the Retort.

At Noon, the Receiver is covered with a volatile Salt that cannot be drove away without a very strong Fire. You must, take Care that this Salt does not stop the
little

little Hole, for it would then burst the Retort.

The Water in the Receiver being heated in half an Hour, dissolves this Salt.

This Salt smells like Peach-kernels. At three o'Clock, new Vapours rise like Sal-armoniack: Those Vapours are condensed into a Salt adhering to the sides of the Receiver, and are not ramified, but form long Striæ which the Vapours of the Water contained in the Receiver cannot dissolve.

Those Vapours are the forerunners of the Phosphorus; and towards the latter end of the distillation, they change their smell into that of Garlick. As they rush out with great violence, care must be taken frequently to unstop the Hole, and even to shut up the Ash-hole entirely. Those white Vapours last but about two Hours. When they have ceased to arise, unstop a little the Air-Holes of the Furnace, to give a passage to the Flame. The Fire must be continued in this middle state, until the first volatile Phosphorus begins to rise; which happens about six o'Clock

o’Clock in the Evening, which you may know by pulling out the stopper, and rubbing the end of it against a warm part of the Furnace : if it is covered with Phosphorus, it will leave a stroke of Light after it. Soon after this there issues a blueish Light thro’ the hole of the Receiver, which continues with more or less violence to the end of the Operation. You may hold your Finger to this Light for half a Minute without burning, and it will be covered with this Light, which you may rub over your Hands and make them all over luminous ; but this Light will sometimes shoot out to seven or eight Inches, with sparkling and cracking, and then it will burn whatever is put before it. When this happens, shut the Door of the Ash-hole, and manage the Fire with great caution : Nevertheless, you must not omit to put fresh Coals under the Retort every two Minutes.

This volatile Phosphorus lasts for two Hours, at the end of which, the blue Flame issuing from the hole, contracts it-

self to about the one Tenth of an Inch ; then must the Fire be increased to the greatest height, and continued so for six or seven Hours, so that all the inside of the Furnace may look white, and the Retort become invisible.

During this great heat, the Phosphorus is distilled like Oil or melted Wax, part of which swims on the Water, the rest is precipitated to the bottom. The Operation is ended when the upper Part of the Receiver grows red.

Then shut all the Doors, and stop all the Holes to stifle the Fire ; the little Hole in the Receiver must also be stopped with Lute or Wax.

Let every Thing remain still for two Days, lest the Phosphorus take fire upon the opening of the Vessels.

When the Receiver is entirely cold, pour three Pints of Water in, and shake it well to mix and precipitate the Phosphorus to the bottom ; then pour the whole into a clean Earthen Pan and let it settle at
the

the bottom. Then pour off this Water, and put boiling hot Water on it to melt the Phosphorus, which will afterwards settle at the bottom of the Vessel in a Cake of a Slate colour. When this Water is almost cold, pour it all into cold Water, and break the Cake into small pieces, and mould it in the following Manner.

Chuse Glass taper Tubes of the Size you would have your Phosphorus; cork the small End of them, and fill them with boiling Water; immerce them also into a Vessel of boiling Water; then throw the Phosphorus in small Pieces into the Tubes, stirring it well with a Piece of Wire. The Water about the Tubes must be kept very hot, until you find the Phosphorus transparent in the Tubes. Let them cool a little in the open Air, and then plunge them in cold Water, which will congeal the Phosphorus. When it is entirely cold, take out the Cork, and thrust it up towards the broad Part of the Tube with a little Stick; cut off the top of each Stick of Phospho-

rus, which is foul and black, then proceed to wash and mould them as before.

N. B. If you intend to make very small Cilinders of Phosphorus, it is best to mould it first into larger.

The Liquid Phosphorus is made thus, viz.

P U T two Grains of the above Phosphorus into a Glass or Marble Mortar, add to it nine Grains of Camphire, then add some Oil of Cloves to it, just to moisten it, work it well with the Pestle, adding more of the Oil until you have put to it three Drams, when, continue to stir, and then pour all out into a Phial and stop it well. With this Phosphorus you make several Experiments in the dark, as rubbing it on the Hands, or Face, which will not burn any thing, as the other does.

It may not be useless here to acquaint Apothecaries that the Yolk of an Egg dissolves Chymical Oils, and Express'd ones, so as to make them mix with Water; and that a very little Spirit of Wine helps to Powder Camphire.

O T H E R

O T H E R

MISCELLANEOUS

OBSERVATIONS, &c. omitted, viz,

LXXXIII.

G Umboge is thought by many to be a Gum; but this being examined more narrowly into, it will appear to be a concentrated Juice of a Plant, and this appears pretty plainly from the extensiveness of the Colour that it gives both to Spirit of Wine and Water; for two Grains of it will give a strong bright yellow Colour to a Quart of Water: This Juice seems to be of a peculiar Kind, for few Things agree both with Spirit of Wine and Water.

LXXXIV.

An hundred Weight of Camphire being sublimed in order to refine it, leaves
only

only two Ounces of an Earthy Impurity ;
so pure an Ingredient this is.

LXXXV.

Red Coral being held a small time in the
Fire loses its red Colour, and becomes whi-
tish.

LXXXVI.

Yellow Wax, if it be scraped small and
shaken for sometime in Spirit of Wine, it
loses its yellow Colour and becomes white;
and this Spirit of Wine may be after-
wards distilled up in Balneo, and serve for
any coarser Uses.

LXXXVII.

Calomel or Mercurius Dulcis being sub-
limed a great number of Times becomes
of no Effect and good for nothing.

LXXXVIII.

Yellow Saunders rasped and distilled
with Water in the Alembic like Rhodium
Wood, gives a most fragrant and delight-
ful Chymical Oil; which is a thing known
but

but to few or any: If Rhodium be to be distilled for its Oil, the reddish Wood must be Chose; for the white gives but little. A diligent Observer may perceive that under the sweet smell of Oil of Rhodium there is a kind of Stink. All Chymists or others who have a Mind to examine the smells of Liquors, &c. ought to smell to them the first thing they do in the Morning; for then the Olfactory Nerves not having been employed about any thing else, can the better judge of Smells. If the Liquor to be examined be also to be tasted, we ought always to smell first; for when we have once tasted, we cannot then form near so good a Judgment of the Smell.

LXXXIX.

A Surgeon at *Paris* dissected a Girl that died of a Dropsy, his Hands grew blue, a Fever came on, from which he had a narrow escape.

XC.

A Patient having taken a Decoction of the Woods, his Hands evidently smelt thereof.

XCI.

A Lady having Freckles on her Face, and being desirous to get rid of them, consented that a blistering Plaister should be laid thereon, which taking off the Skin, and her Face being afterwards healed by proper Applications, the Freckles appeared again in the self same Places; and this I insert to hinder any others from undergoing the like Operation.

XCII.

I have observed at various times that Flints turn to Chalk; therefore we can not depend upon such for Vanes or Weather-cocks, in place of which it would be best to use Glass, which is one of the most permanent things we know of.

XCIII.

XCIII.

If we boyl purging Waters strongly, most of them will be made not purgative, which we suppose to proceed from the points of the inhereing Salts being broken or blunted, so that they cannot stimulate the intestines for purgation.

XCIV.

An Observation upon Sallit-Oil, viz.

This is a thing often wanted among us, and which is often very bad, which proceeds from this Cause viz. That among the Olives that are pressed, many of them are grown rotten, or some are unripe, which spoil the Oil; but if they are ripe, and gathered at a proper time to be pressed, the Oil they give will be good, and continue so many Years if kept cool; and this exception I should have hinted when I spoke of expressed Oils growing Corrosive.

XCV.

A curious and useful Glue.

Take an Ounce of Ising-Glass, beat it to Shreds, put it into a pint of Brandy, where, by means of a little heat, or gentle simmering over a common Fire, it is gradually dissolved; then strain the Solution through a piece of Fine Muslin; and thus you have a Glue, that should be kept in a Glass close stopped.

This Glue, with a very gentle Heat dissolves thin, transparent, and almost limped; when used in the manner of common Glue, it joins the parts of Wood together, stronger than Wood is joined to itself; so that the pieces thus joined will break in any other part rather than where they are Glued. It is also remarkable that if Saw dust or powdered Wood, be made into a Ball with this Glue, the Ball will prove solid and elastick; so that it may be turned and used as a Bowl without breaking. And whether by means of such a Glue as this, something considerable may
not

not be effected in the embossing of Wood-work, we leave to farther Experience. The Glue being thus made with Brandy, will keep longer without corrupting ; and is therefore a proper form wherein to preserve Ising-Glass ready dissolved for the fining of Wines, or other uses.

Another curious use of this Glue is, that it serves excellently for taking off the impressions of Medals, or Coin : Thus if a little of this melted Glue be poured thinly upon a Guinea, suppose, so as to cover the whole surface of the Piece, and the Glue be suffered to remain thereon for a Day or two, till all becomes thoroughly dry, it will appear hard and transparent, like a piece of Muscovy Glass, with the impression of a fair Guinea in Entaglio, as they call it, on one side, and in Relievo on the other.

This Glue, therefore, dries into a very strong, tough; and transparent substance ; not easily to be hurt or damaged by any thing but aqueous moisture, which would soon dissolve it ; so that it is not fit to be

used in any Work that must be exposed to wet or Weather; but for a Glue to stand the Weather, let choice be made of the common Glue dissolved with Linseed Oil.

The natural and experimental History of Glue might greatly tend to the improvement of Chymistry: For it should seem as if all animal and vegetable Substances, were either originally made up, or might at last be resolved into Glue or Jelly. Doubtless a knowledge of the nature of Ropiness, Viscidity, Siziness, Mouldiness. &c. would give considerable light to natural Philosophy and Medicine and lead, us farther into the effects, nature and process of Growth, Fermentation, and Putrefaction. This Enquiry therefore should be prosecuted with Care; beginning, for Example, with that viscous Substance the white of an Egg, or serum of the Blood, in their natural Salts; and observing how their tenacity is altered, by moderate degrees of Warmth or Cold. The Enquiry might next proceed to the mucilaginous Matter of Snails, Frog-spawn, Fish, and
other

other Animals in Embrio, Vegetables, &c. and gradually proceed to Subjects of the Mineral Kingdom: And this Enquiry we apprehend may be usefully prosecuted without the Assistance of a Chymical Apparatus; so as to discover the best Ways of preparing Cements, Glues, Sizes, Jellies, &c. for various Mechanical and Oeconomical Uses.

XCVI.

For the Use of those concerned in the preparation of Medicines, viz.

An Account of what quantities of Chymical Oil, or Extracts, some Ingredients afford.

THREE Pounds of black Ellebore extracted with Water, and then by digesting in Spirits, gives a Pound of Extract.

Three Pounds of Agarick extracted in Brandy, or equal Parts of Spirit of Wine and Water, give one Pound fourteen Ounces of Extract and Resin.

Three

Three Pounds of Colocinth picked from the Seeds, give a Pound of Pulp, three Pounds of which Pulp, give a Pound and two Ounces of Extract.

Three Pounds of Turbith-Root, give eight Ounces of Extract.

Ten Bushels of Chamomile Flowers, give five Ounces one Dram of Chymical Oil.

An hundred Weight of Hyfop, gives two Ounces of Oil.

Penyroyal, an hundred Weight, gives two Ounces.

Marjorome, an hundred Weight, gives two Ounces and half.

Rosemary gives six Ounces.

An hundred forty eight Pounds of Sage, gave five Ounces one Dram.

XCVII.

An Account of what quantity of Volatile Salts, divers Plants, &c. gave, viz.

Celandine, a Pound, gave two Drams.

Fumitary, two Drams forty eight
Drams. Night-

Night-shade, two Drams.

Hemlock, one Dram twelve Grains.

Wild Purslain, one Dram two Grains.

Fennel, two Drams twenty Grains.

Wood-Sorrel, one Dram.

Shepherds Purse, two Drams forty eight Grains.

Meadow Sweet, one Dram fifty Grains.

Lillies of the Valley, one Dram.

Nettles, fifty eight Grains.

Hops, one Dram.

Elder, one Dram fifty four Grains.

Hounds-tongue, one Dram six Grains.

Stinking Orach three Drams twelve Grains.

Burdock Leaves, one Dram.

Violets without the Flowers, two Drams twenty Grains.

Young Onions, one Dram twelve Grains.

Mushrooms, two Drams.

The way to prepare these Salts is thus,
viz. Five Pounds of the Green Herb must
be put into a large Retort, which must be
placed in an Iron Pot fixed in a Furnace,
where it must be covered with Bakers
Ashes,

Asbes, to which must be joined a Receiver, and a very gentle Fire continued under it for five or six Days, to sweat over or distil the Phlegm or Moisture, and about the sixth Day a dry Receiver must be applied, and the Fire augmented to drive up the volatile Salt, which when come, the Fire must be immediately taken out.

XCVIII.

A harder Glass than common.

WE took four Ounces of Borax, and an Ounce of fine white Sand reduced to Powder, and melted them together in a large close Crucible, set in a Wind Furnace, keeping a strong Fire for half an Hour; then taking out the Crucible, and, when cold, breaking it, we found at the bottom a pure hard Glass, capable of cutting Glass almost like a Diamond.

We have here an Experiment, which, being duly varied, may lead to some considerable Improvements in the Arts of Glass, Enamels, and Artificial Gems:

It

it shows us an expeditious Method of making Glass, without the use of fixed Salt, which has generally been thought an essential Ingredient in Glass; and which is the Ingredient that gives the common Glass it's Softness. But Borax is a neutral Salt, which being urged by the Fire, does not turn any way alkaline; but, of itself, without Addition runs presently into Glass. And whether other ingredients might not here be advantageously substituted for soft Sand, particularly calcined Flints, powdered Chrystal &c. we recommend to further Experience, so as to attempt making a Glass, that shall, in some degree, approach the hardness of a Diamond.

If a pure transparent Glass, of this degree of hardness, can be tinged in the ordinary manner, by means of the prepared metalline Calces, it should seem that the art of making Counterfeit Gems would then have gained its perfection; for the Colours thus introduced are in no respect inferior, but perhaps superior, to the natural colours of the Sapphire, Emerald,

Ruby &c. So that nothing more seems wanting to perfect this Art, than the discovery of a dense, hard, crystalline Glass, that shall polish like Chrystal, and not scratch in the wear.

In order to give this Glass the desired degree of hardness, it may be proper to continue it long in the Fire ; which is constantly found to add strength and hardness to Glass, insomuch that common Glass by being constantly kept in a strong Fusion for a Month or six Weeks, has become of a Stony hardness ; a large part of the fixed Salt thus going off in the Fire ; and consequently leaving the Glass less charged with Salt, or nearer approaching to the native hardness of the Flints or Sand employed in this preparation.

If the use of Borax should, in this manner be found to have a considerable effect, it would be proper to enquire farther into its natural and Chymical History ; which seems at present to be little regarded. Perhaps it were not impossible to find this useful substance in some parts of Europe,
to

to imitate it by Art, and to discover better ways of refining it than those now usually practised.

The facility wherewith this Salt runs into Glafs, or the small degrees of Heat, and the short time required for that purpose, if we will attend to, may be capable of enriching Chymistry, and more particularly the History of Glafs.

XCIX.

The Process by which Longueville imitated Gold, for which the Dutch boiled him alive in Oil, was this :

Take Copper four Ounces, calcine it with common Sulphur till it comes to an Ounce and Quarter, which must be done by several red-hot Makings, and when it becomes green, it is enough. Then take this calcined Copper, and an Ounce of Borax, melt them very well together, then cast it out of the Crucible, and beat off the Dross, and melt it again with as much Borax ; cast it out again, and beat off the

Q q 2

Dross

Dross as before, repeating this Work a third Time, then melt again by itself in a strong Fire, adding thereto two Ounces of Gold ; let it stand a while in Flux, add some Borax to it, and keep it there an Hour, then cast it out into Ingots, repeating the Fluxing till the Borax remains white ; then melt this Artificial Gold alone, and cast into it Grains of Nitre, till it has got a good large Skin on the top of it, then cast it into Ingots ; and it is done.

So far the Receipt as communicated to me by a *German* Professor of an University.

What Faults this Man committed in his Time I know not ; but I regret his Death if it was for Gold-making ; for I think this Process far from that ; however, be it as it will, a Friend of mine knows a Gentleman who saw *Longueville* cast down by an hollow Wooden trunck into a Cauldron of boiling Oil, when he stood so nigh it, that some of the Oil flew on his Cloathes.

C.

An Account of poisonous Worms in eatables, &c.

There is a poisonous Worm in the hairy Part of the Muscle, which is the thing that makes People so Sick, and often Swell; even some have been seen to be full of Blotches after eating them; The Muscle considered abstractedly of this Worm is not poisonous.

There is a noxious Animal in Sheep's Trotters.

There is likewise one in Cow Heels.

Likewise in the Lamprey.

There is a very little red Animal of the creeping Kind in the Body of the Crab between the Claws, which is the reason that that Fish often makes People both vomit and purge.

There are little Animals found upon the Livers of Sheep of the shape of Flounders, which I have not yet had Opportunity to examine whether noxious.

There are Worms of the Tape-kind found in the Guts of young Lambs, of which

which I have met with some of six Feet long in those of but five Weeks old.

If Sprats or Herrings disagree with People, it must be from the abundance of Oily-Fat they abound with; and about six Years since a Glut of the latter was brought to *Edinburgh*, of which People eat greedily, and nineteen of them died.

There are live Animals also found in Bay-berries, in Vinegar, and Brandy, into which last they must certainly come after it is made; otherwise they would be killed by the Heat that is used in distilling Wine into Brandy.

CI.

We have promised to give an Account of the quantity of Chyle or Nutriment that divers Aliments give into the Blood, proper to be known by Persons that are too corpulent, or too thin, viz,

A Pound of Beef gives seven Drams and eleven Grains.

A Pound of Veal, nine Drams and twelve Grains. A

A Pound of Mutton, eleven Drams and twenty two Grains.

A Pound of Lamb, nine Drams and six Grains.

A Pound of Chicken, twelve Drams and sixteen Grains.

A Pound of Pidgeon, eight Drams.

A Pound of Pheasant, ten Drams and fourteen Grains.

A Pound of Partridge, twelve Drams and ten Grains.

A Pound of Calves Foot, ten Drams.

A Pound of Carp, eight Drams and six Grains.

A Pound of Turkey, ten Drams and forty Grains.

A Pound of Calf's Liver, seven Drams and twenty three Grains.

A Pound of Wild Duck, seven Drams and twenty Grains.

A Pound of Lobster, ten Drams and twelve Grains.

And a Pound of White Wheat Bread, gives four Ounces, and one Dram of Nourish-

ishment to our Bodies; therefore called the Staff of Life.

CII.

An Account of the famous Lens or Burning-Glass made at Dresden, by Command of Augustus, King of Poland, by Monsieur Shernoufen, and of the Experiments I made with it at London, viz.

THIS Lens is made of a compound Metal, of a concave Form, and about four Feet Diameter, which being placed in an oblique Form, there streams from it a Fire or Light of about four Feet in length, which Light is so extremely bright, that you can scarce look upon it. The heat that this Focus gives is astonishing, and is thought to be ten times hotter than the Glass-House Fire. It Vitrifies or turns to Glass most things immediately, such as Bricks, Crucibles, even Tobacco-Pipes,

Pipes, Slates from Houses, Tiles, China-Ware, all which bear a great heat, will be immediately turned to Glass. Wood will be burned under Water ; Silver will be driven away in Fumes, so will even Gold, only leaving a small quantity of a blackish Earth. If a Diamond be held in the Focus it grows Opake, or loses its transparency, and becomes full of Flaws ; tho' a like Diamond being put in the Glass-House Fire for six Weeks came out unhurt. There is one Thing that seems wonderful, namely, that the Atoms in the Sun, which seem to be of a Vegetable Nature, don't seem to be calcined by this frightful Fire. The thing that bears the heat best, is burnt Hartshorn, for this being destitute of Salts, cannot Vitrifie or turn to Glass ; the Presence of Salts occasioning that change in Bodies, and the Absence of them hindering it : And indeed any Person well versed in Chymical Knowledge, might think no great change would be brought about in the burnt Bone ; for it is a Virgin-Earth, and one of the real or last Principles of

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Things,

Things, and no further than that we cannot go in investigating the Nature of Bodies.

While Experiments were making upon the Burning-Glass, a fatal Accident happened, *viz.* A French Officer of the Army, coming into the Place, and, not knowing what was doing, capered or danced thro' the Focus, which taking his Head, he died upon the spot.

F I N I S.

A
L I S T

Of some Useful Discoveries made by the Author, or that he is Master of, viz.

A Fine Green Ultramarine that both paints and glazes, excelling the Blue Ultramarine, which the World never had before ; and approved of by the King's Painters at *London*.

A Scarlet Lake that dries well.

A transparent Yellow.

A curious Purple.

A fine Green for Water-painting.

A White for Water that don't turn black.

Making Citron-water here like *Barbadoes*.

To extinguish Houses on Fire speedily.

To prepare Paper for Hangings that can't take Fire.

To prepare Wood to stand Weather like Stone.

A LIST, &c.

In Medicine, viz.

Curing ulcerous Cafes, Blotches, Breakings out, Scabbiness, &c. when other Practice fails.

Curing venereal Cafes without Salivation.

An admirable Remedy against Effusions of Blood from an internal Cause, as by Urine, Spitting, &c. especially the too great Flux in the Sex, which has been fully tried at *London*, and at *Paris*, under the Inspection of Dr. *Cowper*, by Order of the King's Physician, and for which Certificates were given concerning its great Efficacy, Signed by Persons of Rank in Church and State. Which Remedy a little varied is a grand Cure against a Flux, and bloody Flux, and has been fully tried at *London* by many that can be named.

